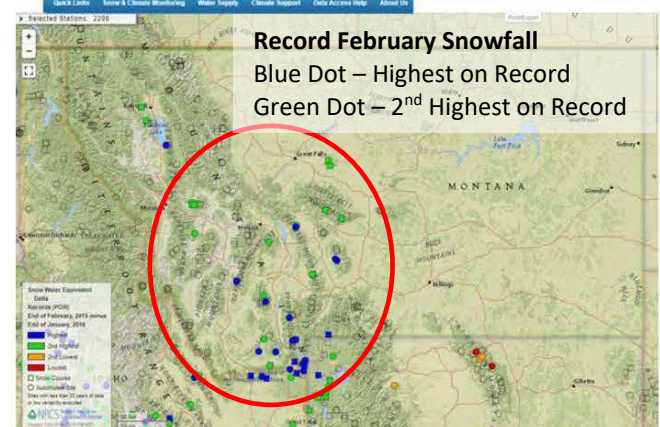
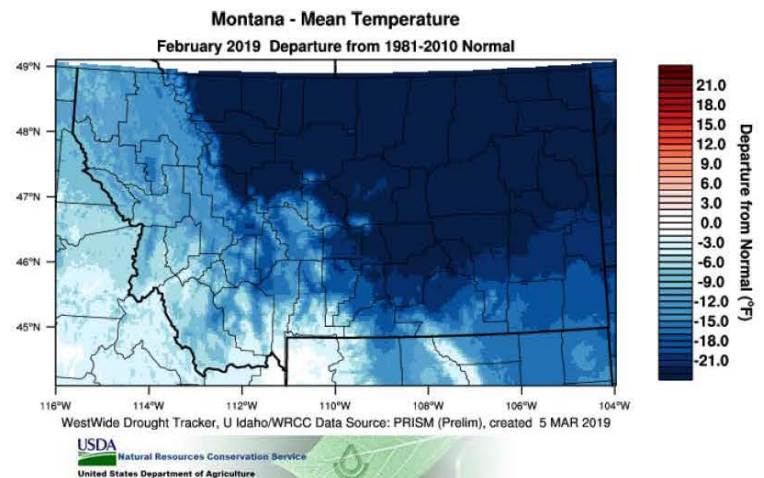
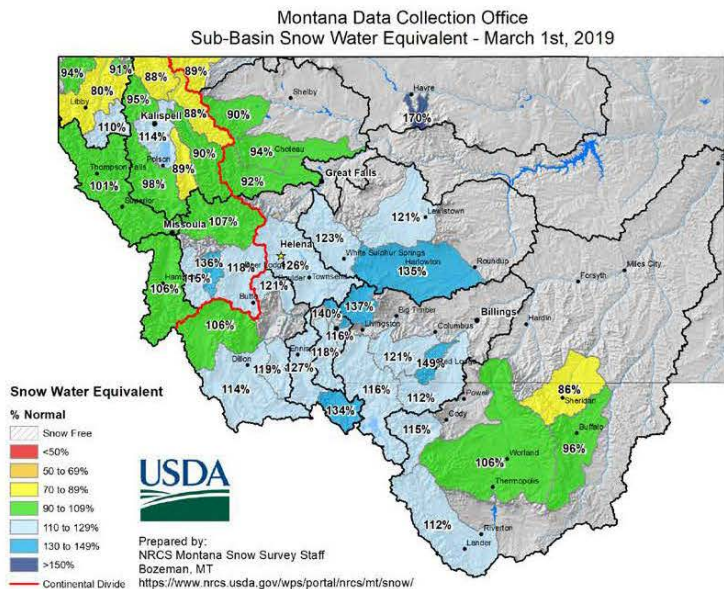


# Montana

## Water Supply Outlook Report

### March 1<sup>st</sup>, 2019



**Well above normal to record-setting February snow totals boosts snowpack across Montana.** February was cold, very cold. Abundant moisture from the Pacific collided with this cold air mass to produce significant snowfall across the state, which resulted in above normal to record-setting snowfall for the month. The continuous storms approaching from the southwest that impacted southern Montana set new records for February monthly snowfall totals at many snowpack monitoring locations.

*For more water supply and resource management information, contact:*

**Lucas Zukiewicz**  
***Water Supply Specialist***  
**Federal Building**  
**10 East Babcock, Room 443**  
**Bozeman, MT 59715**  
**Phone 406-587-6843**  
**lucas.zukiewicz@mt.usda.gov**  
<http://www.nrcs.usda.gov/wps/portal/nrcs/main/mt/snow/>

## Montana Water Supply Outlook Report as of March 1<sup>st</sup>, 2019

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### How Forecasts Are Made

Most of the annual streamflow in the Western United States originates as snowfall that has accumulated high in the mountains during winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Predictions are based on careful measurements of snow water equivalent at selected index points. Precipitation, temperature, soil moisture and antecedent streamflow data are combined with snowpack data to prepare runoff forecasts. Streamflow forecasts are coordinated by Natural Resources Conservation Service and National Weather Service hydrologists. This report presents a comprehensive picture of water supply conditions for areas dependent upon surface runoff. It includes selected streamflow forecasts, summarized snowpack and precipitation data, reservoir storage data, and narratives describing current conditions.

Snowpack data are obtained by using a combination of manual and automated SNOTEL measurement methods. Manual readings of snow depth and water equivalent are taken at locations called snow courses on a monthly or semi-monthly schedule during the winter. In addition, snow water equivalent, precipitation and temperature are monitored on a daily basis and transmitted via meteor burst telemetry to central data collection facilities. Both monthly and daily data are used to project snowmelt runoff.

Forecast uncertainty originates from two sources: (1) uncertainty of future hydrologic and climatic conditions, and (2) error in the forecasting procedure. To express the uncertainty in the most probable forecast, four additional forecasts are provided. The actual streamflow can be expected to exceed the most probable forecast 50% of the time. Similarly, the actual streamflow volume can be expected to exceed the 90% forecast volume 90% of the time. The same is true for the 70%, 30%, and 10% forecasts. Generally, the 90% and 70% forecasts reflect drier than normal hydrologic and climatic conditions; the 30% and 10% forecasts reflect wetter than normal conditions. As the forecast season progresses, a greater portion of the future hydrologic and climatic uncertainty will become known and the additional forecasts will move closer to the most probable forecast.

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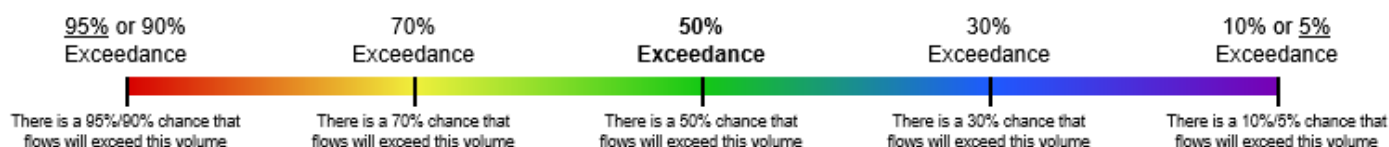
## What's New?

The first official forecasts are being released by the NRCS Montana Snow Survey and Water Supply Forecasting Program for this coming spring runoff season, and the forecasts are being released in a new graphical format. If you are uncomfortable with this new format, the old format can still be found [here](#).

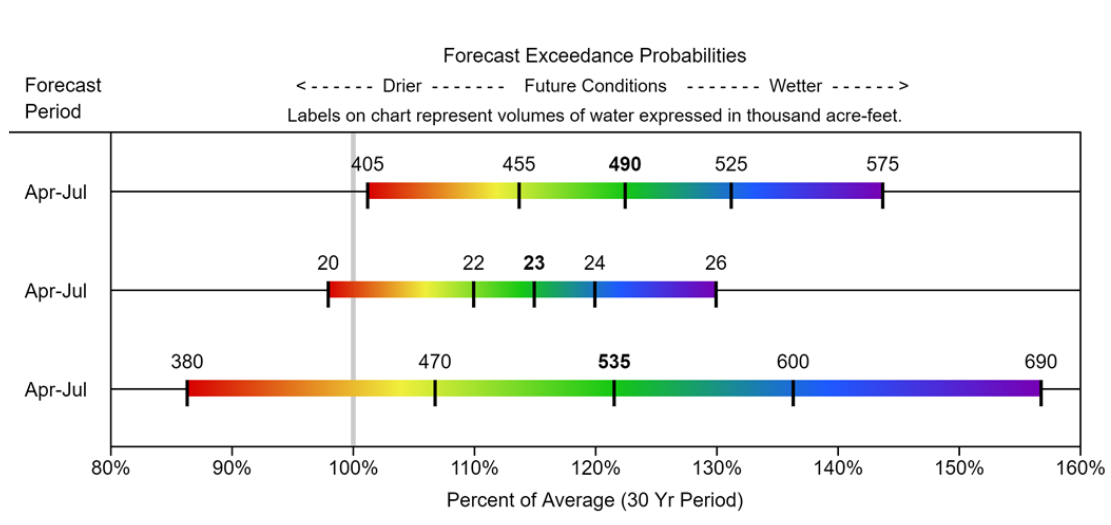
Typically, the NRCS has presented streamflow forecasts as a table format showing the five exceedance probabilities compared to the 30-year average as follows:

Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast							
Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
APR-JUL	315	375	420	187%	460	525	225

The Forecast Chart provides a visual alternative to the table. The forecast range is represented by a colored bar. Vertical lines on the bar signify the five forecast exceedances.



Below is an example. The numbers above the forecast bars are the five exceedance probability volumes in thousand acre-feet (KAF). Each exceedance forecast's percent of average can be estimated by looking at the horizontal axis. The gray line centered above 100% on the horizontal axis represents the 1981-2010 historical average streamflow for the forecast period.



In this example, almost all the forecast bars in the basin are shifted right of the gray vertical line indicating forecasts of above average streamflow. The 50% exceedance is represented by the black line in the green portion of the colored bar. For the top most line, this represents a forecast volume of 490KAF, which is ~123% of average. If drier than normal future conditions occur the 70% exceedance forecast may be more likely (455KAF or ~114% of average). If future conditions turn wetter than normal, the 30% exceedance forecast may be more likely (525KAF or ~132% of average). Water users are encouraged to consider the range of forecast exceedances instead of relying solely only on the 50% forecast.

## Snowpack – Overview

A weather pattern was in place throughout most of this winter's water year, which continually ushered in above-average temperatures and below normal snowfall for some river basins. Fortunately, a MAJOR pattern change took place during the month of February; cold air from the Arctic persisted through most of the month and set up shop over Montana. Abundant moisture from the Pacific collided with this cold air mass to produce above-average to record snowfall across the state. Some basins favored by southwest flows (storms approaching from the southwest) in southern Montana, which were below normal for snowpack on February 1<sup>st</sup>, experienced the snowiest February on record. SNOTEL sites in the Upper Madison, Upper Gallatin, Ruby and Red Rocks River basins set new records for the month. As of March 1<sup>st</sup>, snowpack totals in these river basins are amongst the best in the state and are well above normal for this date. Snowfall was incredible and persistent at the [Black Bear SNOTEL site](#), located along the Montana/Idaho border, where 19.6" of snow water equivalent (SWE) was added to the snowpack during the month. This set a new record for the month of February but fell short of the all-time monthly record set in December of 1996 when 25.6" of SWE was added. Overall, it was an amazing month of snowfall across the state.

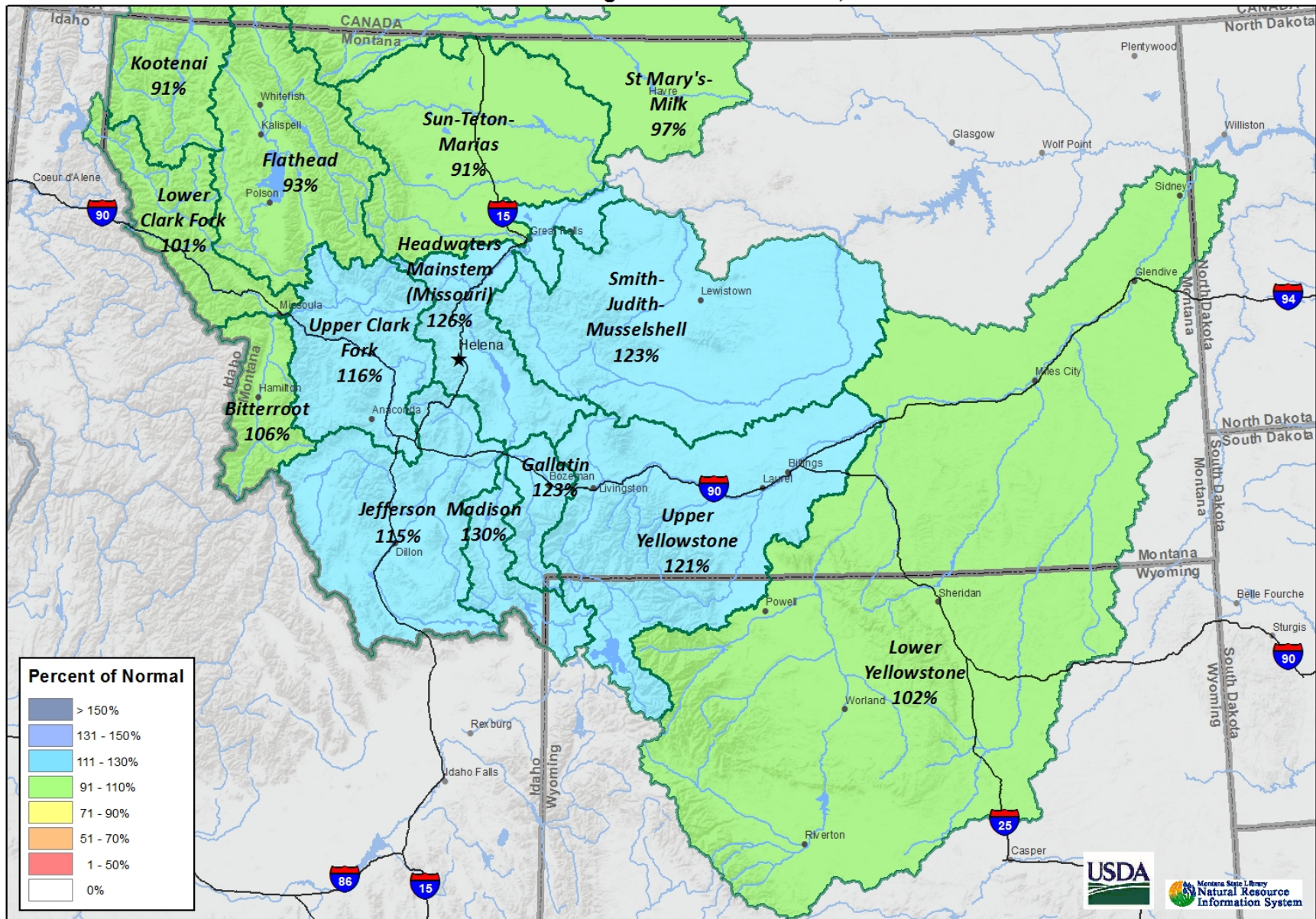
While the storm patterns in place through February didn't deliver record setting snowfall in the northern mountain ranges, snow totals for the month were above average. The abundant snowfall helped some river basins make significant rebounds to near-normal conditions for snowpack on March 1<sup>st</sup>, though two basins (Kootenai, Sun-Teton-Marias) remain slightly below normal due to early season snowfall deficits.

But this is an "El Nino" year so we shouldn't be getting all this snowfall and cold weather, right? Well, kind of. This year will be recorded as a "weak El Nino" year, and early snow season forecasts for increasing equatorial sea surface temperatures didn't play out. There is a decent correlation between the strong El Nino winters and snowpack in Montana, but the weak years can go either way for a number of reasons. The Arctic Oscillation, Madden Julian Oscillation, and North Atlantic Oscillation all impact the way cold air and precipitation spill into the Treasure State. [Long range \(March – May\) forecasts issued by the NWS](#) still indicate a possibility of above average temperatures in western Montana, but we'll have to wait and see how the season plays out. [Forecasts for March](#) indicate that the below average temperatures will remain through the month, and precipitation has equal chances of being below or above average.

### Snow Water Equivalent

<b>3/1/2019</b>	<b>% Normal</b>	<b>% Last Year</b>
Columbia River Basin	101	73
Kootenai in Montana	91	75
Flathead in Montana	93	68
Upper Clark Fork	116	72
Bitterroot	106	80
Lower Clark Fork	101	82
Missouri River Basin	120	88
Jefferson	115	84
Madison	130	107
Gallatin	123	90
Headwaters Mainstem	126	72
Smith-Judith-Musselshell	123	90
Sun-Teton-Marias	91	59
St. Mary-Milk	97	71
Yellowstone River Basin	110	76
Upper Yellowstone	121	74
Lower Yellowstone	102	80
West of Divide	101	73
East of Divide	114	82
Montana State-Wide	110	79

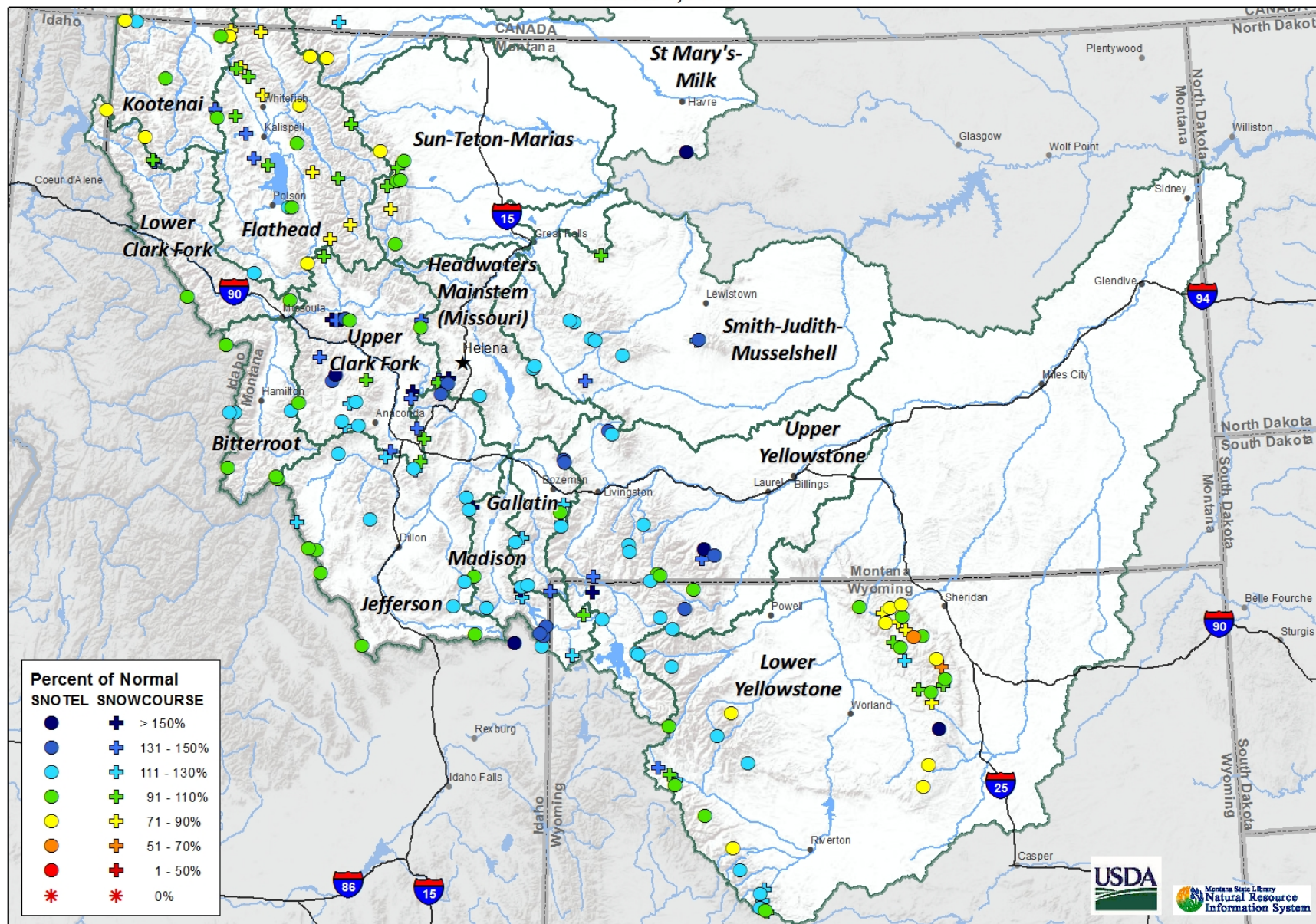
Montana Data Collection Office  
Current Snow Water Equivalent  
Basin Percentage of Normal - March 1, 2019



Note: Data includes SNOTEL and Snow course Measurements on March 1, 2019



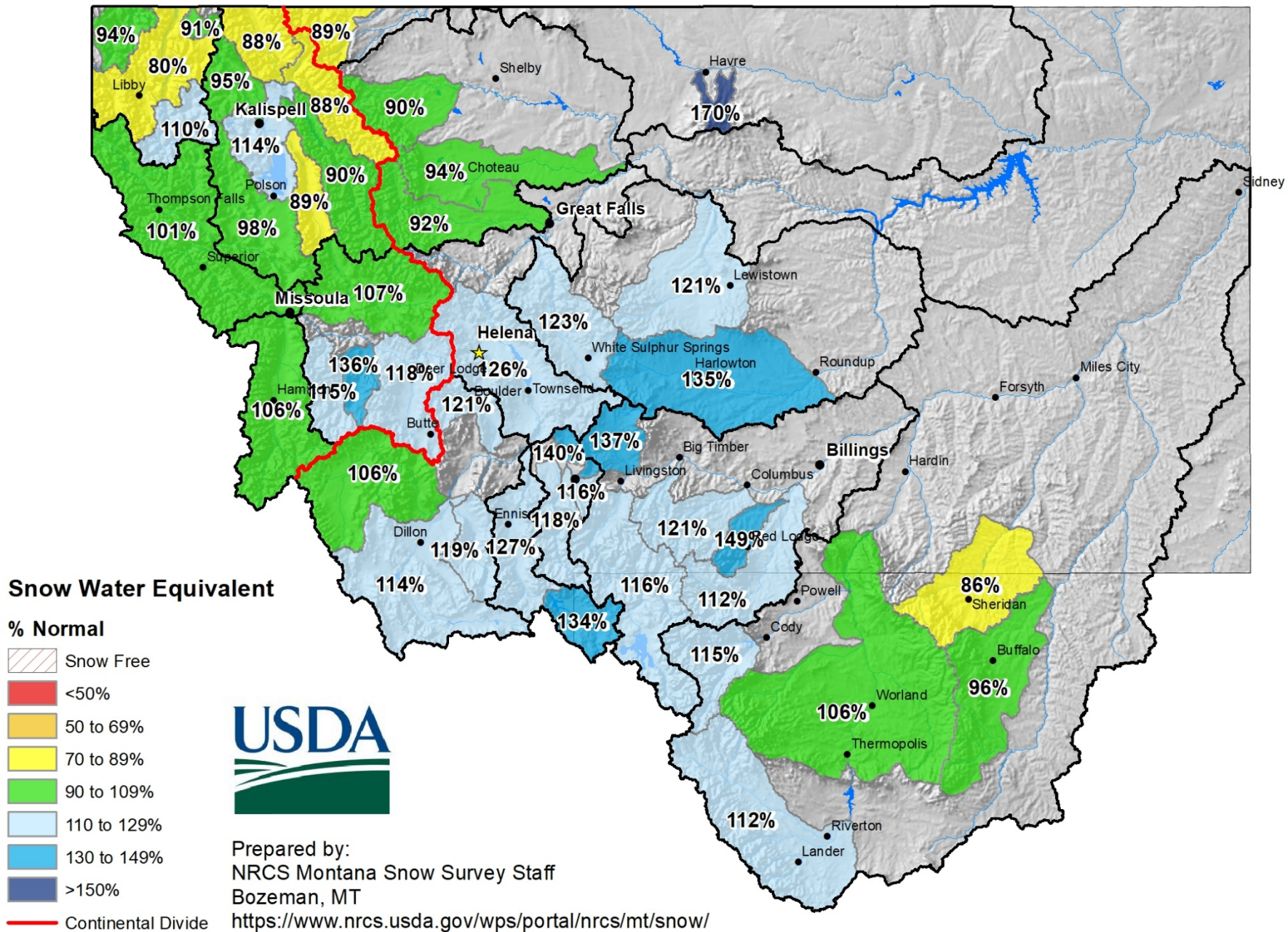
Montana Data Collection Office  
Current Snow Water Equivalent  
March 1, 2019





# Montana Data Collection Office

## Sub-Basin Snow Water Equivalent - March 1st, 2019



## Precipitation - Overview

For the most part, when precipitation is referenced in this report it refers to snowfall, but it is important to keep in mind that water year-to-date precipitation also considers the early winter months of October and November. These months can bring rain or snow, and SNOTEL sites do not record precipitation and snow water equivalent (SWE pillow) with the same gage. This distinction is important because, in general, the pillow is better than the standalone precipitation gage at measuring winter precipitation (snow). Weighing precipitation gages have been demonstrated to under catch solid precipitation but, even though they have their liabilities, they still provide important data about rain in the fall and spring. These data can be critical to understanding what happened during the summer months and determining the antecedent conditions that set the stage for runoff and water supply.

The northern basins (Kootenai and Flathead) are great examples of how antecedent conditions can be useful in understanding runoff in the coming year. The past summers of [2017](#) and [2018](#) proved to be very dry in this region, and had a direct impact on soil moisture and base flows as we entered winter. Late fall till the end of November continued to have below average precipitation. Fortunately, February changed the persistent pattern across the state, and water year-to-date precipitation totals improved in these areas. Snowpack made a recovery in the northwest basins and is now slightly below to near normal. Thinking about the bigger picture, and if we put all this together, the summer and early winter set the stage and there are some remaining deficits that need to be made up.

Across the rest of the state, water year precipitation totals are in better shape with precipitation near to above average in most areas on March 1<sup>st</sup>. The east side of the Divide is entering the period of the year that typically provides increased precipitation (March – June) while the western basins start to see monthly precipitation totals decrease from earlier in the winter. One thing is sure, this year has been anything but normal, so what we will receive in the future remains uncertain. For now, the improvements we've seen over the last month are welcome and we hope these favorable patterns continue through runoff this year.

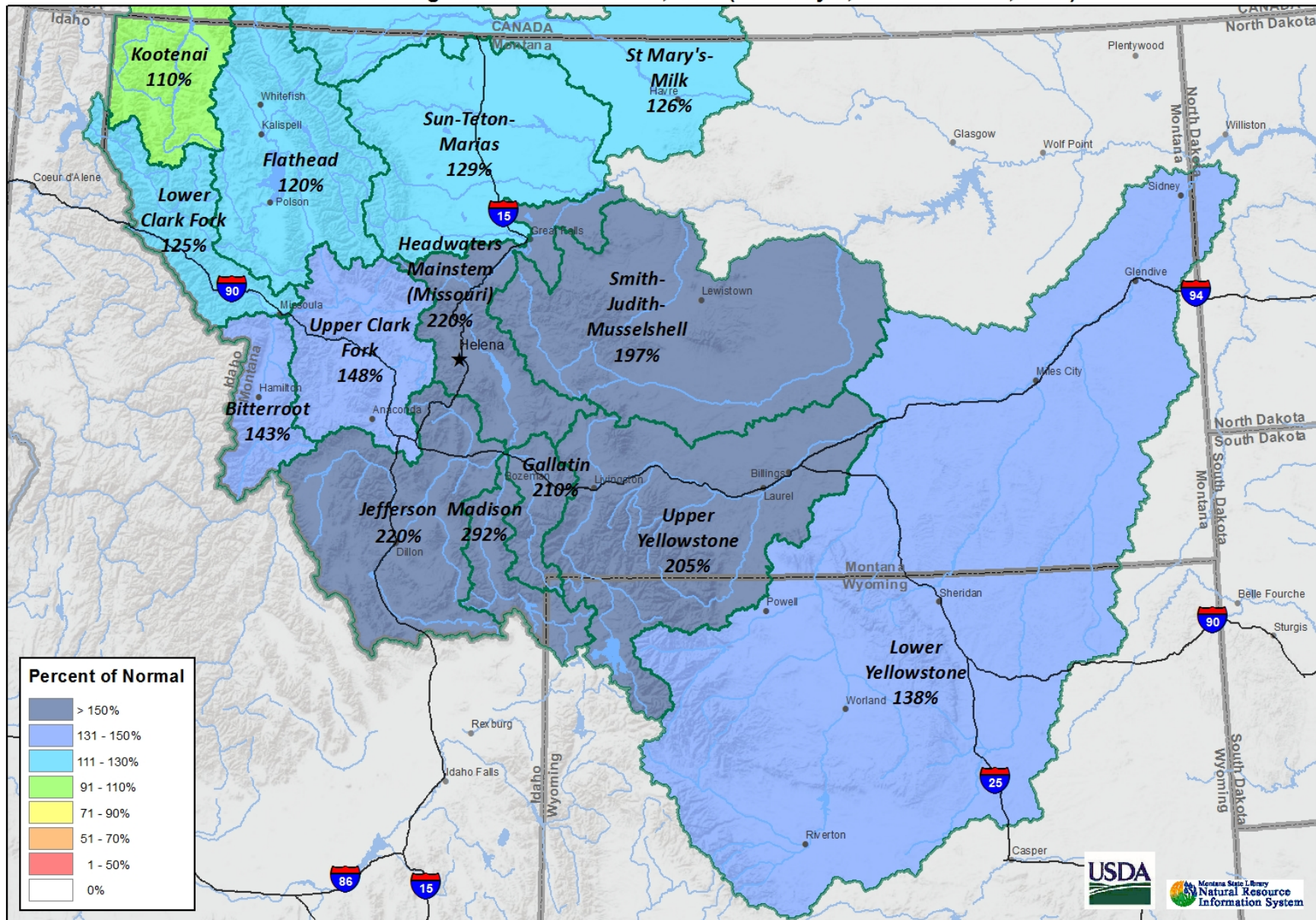
### ***Precipitation***

<b>3/1/2019</b>	<b>Monthly % Avg</b>	<b>Water Year % Avg</b>	<b>WY % Last Year</b>
Columbia River Basin	131	95	74
Kootenai in Montana	110	82	70
Flathead in Montana	120	94	70
Upper Clark Fork	148	104	76
Bitterroot	143	103	84
Lower Clark Fork	125	95	77
Missouri River Basin	234	119	98
Jefferson	220	114	104
Madison	292	122	109
Gallatin	210	130	103
Headwaters Mainstem	220	123	85
Smith-Judith-Musselshell	197	116	94
Sun-Teton-Marias	129	97	65
St. Mary-Milk	126	94	70
Yellowstone River Basin	170	109	86
Upper Yellowstone	205	119	81
Lower Yellowstone	138	101	90

West of Divide	131	95	74
East of Divide	199	112	90
Montana State-Wide	180	107	83

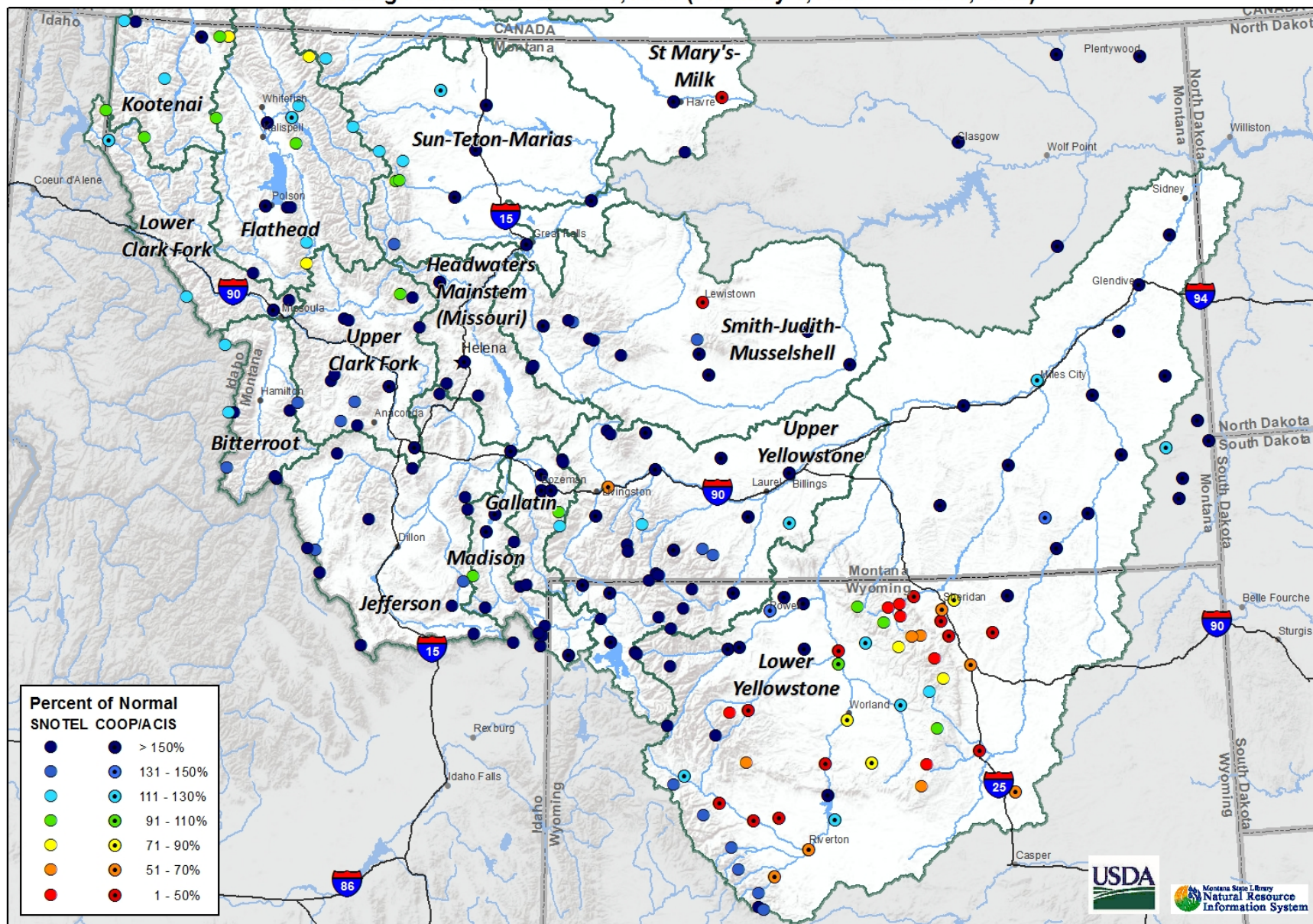


**Montana Data Collection Office**  
**Monthly Precipitation**  
**Basin Percentage of Normal - March 1, 2019 (February 1, 2019 - March 1, 2019)**



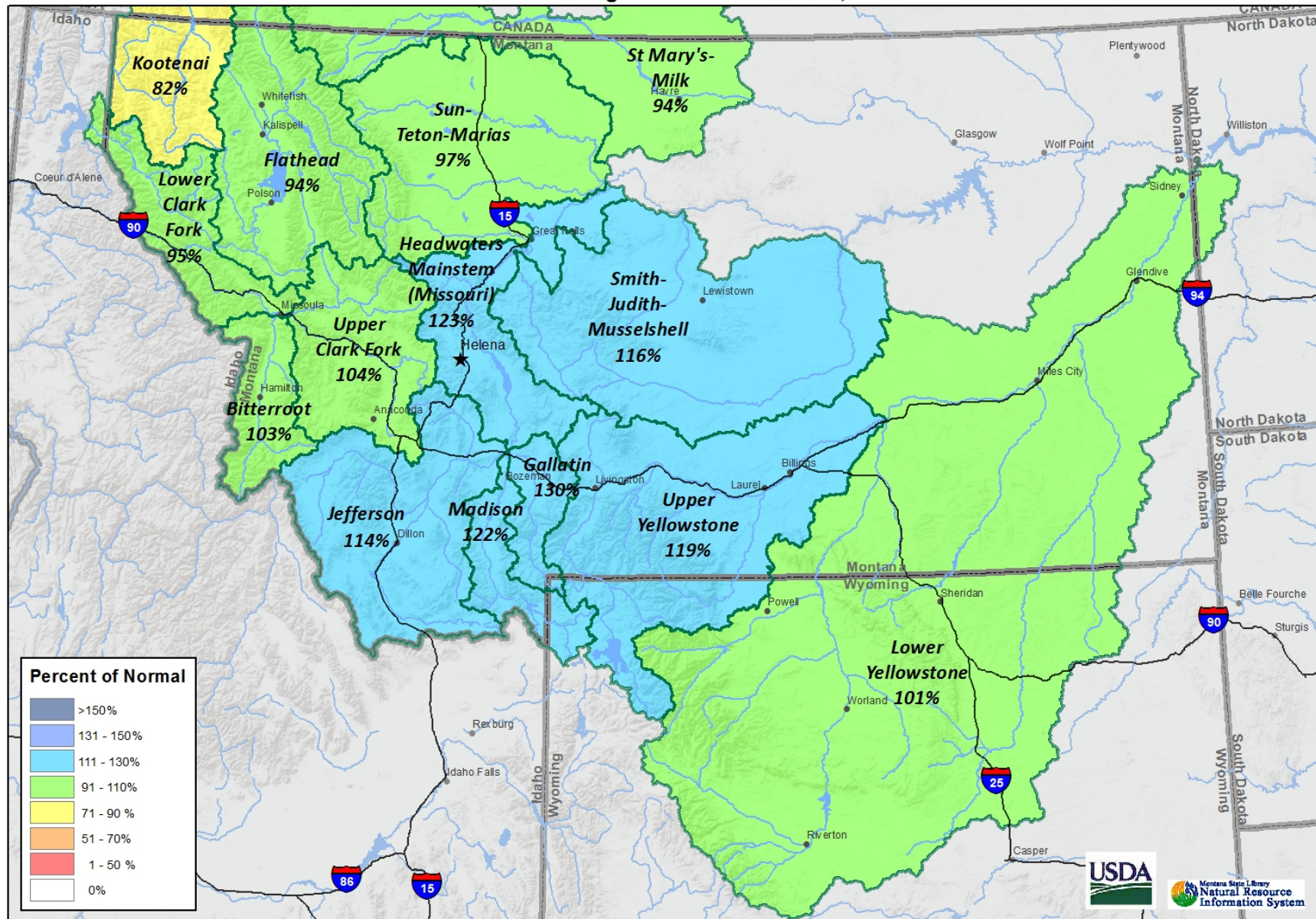


Montana Data Collection Office  
 Monthly Precipitation  
 Percentage of Normal - March 1, 2019 (February 1, 2019 - March 1, 2019)



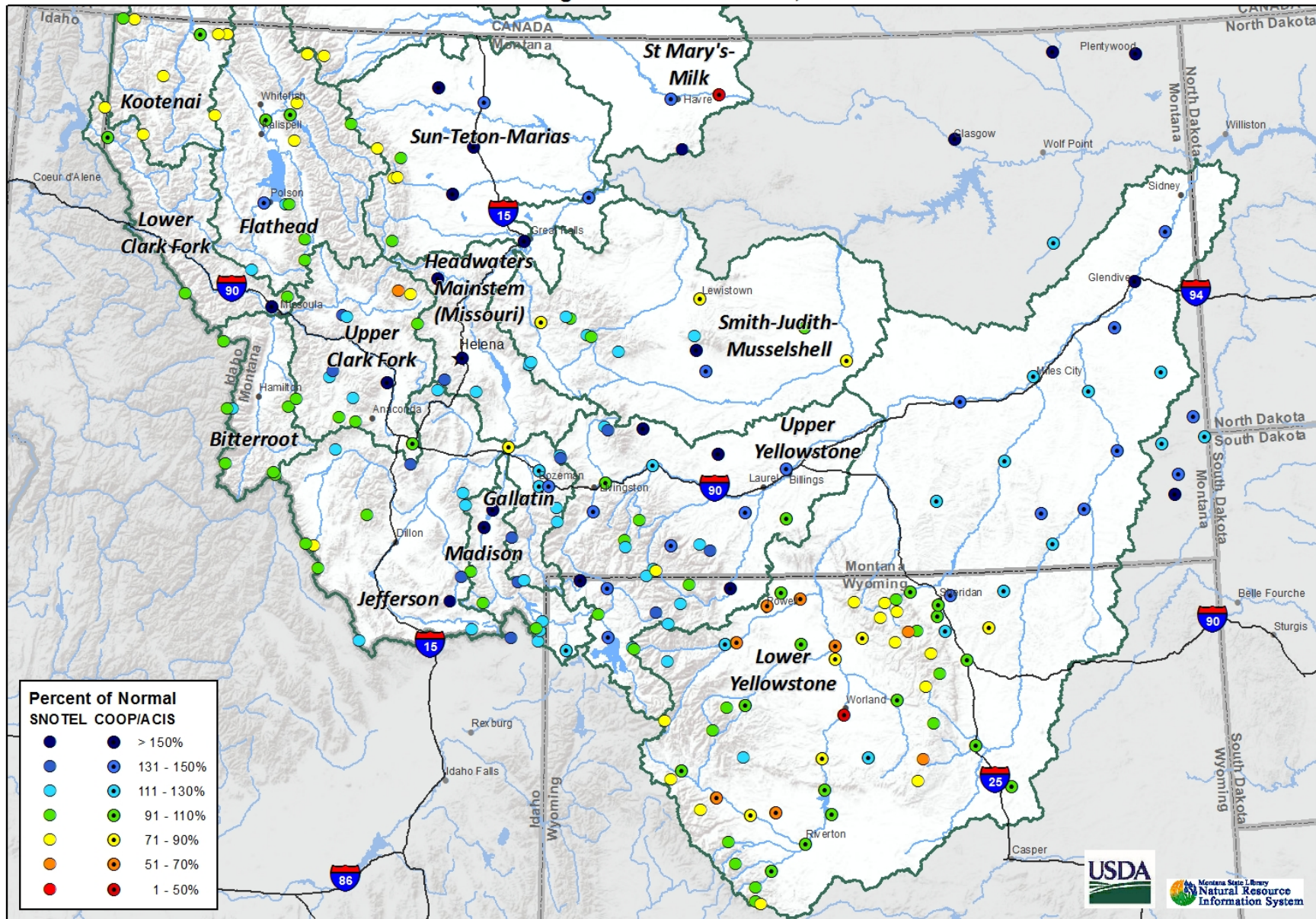


Montana Data Collection Office  
Water Year to Date Precipitation  
Basin Percentage of Normal - March 1, 2019





Montana Data Collection Office  
Water Year to Date Precipitation  
Percentage of Normal - March 1, 2019



## Reservoirs - Overview

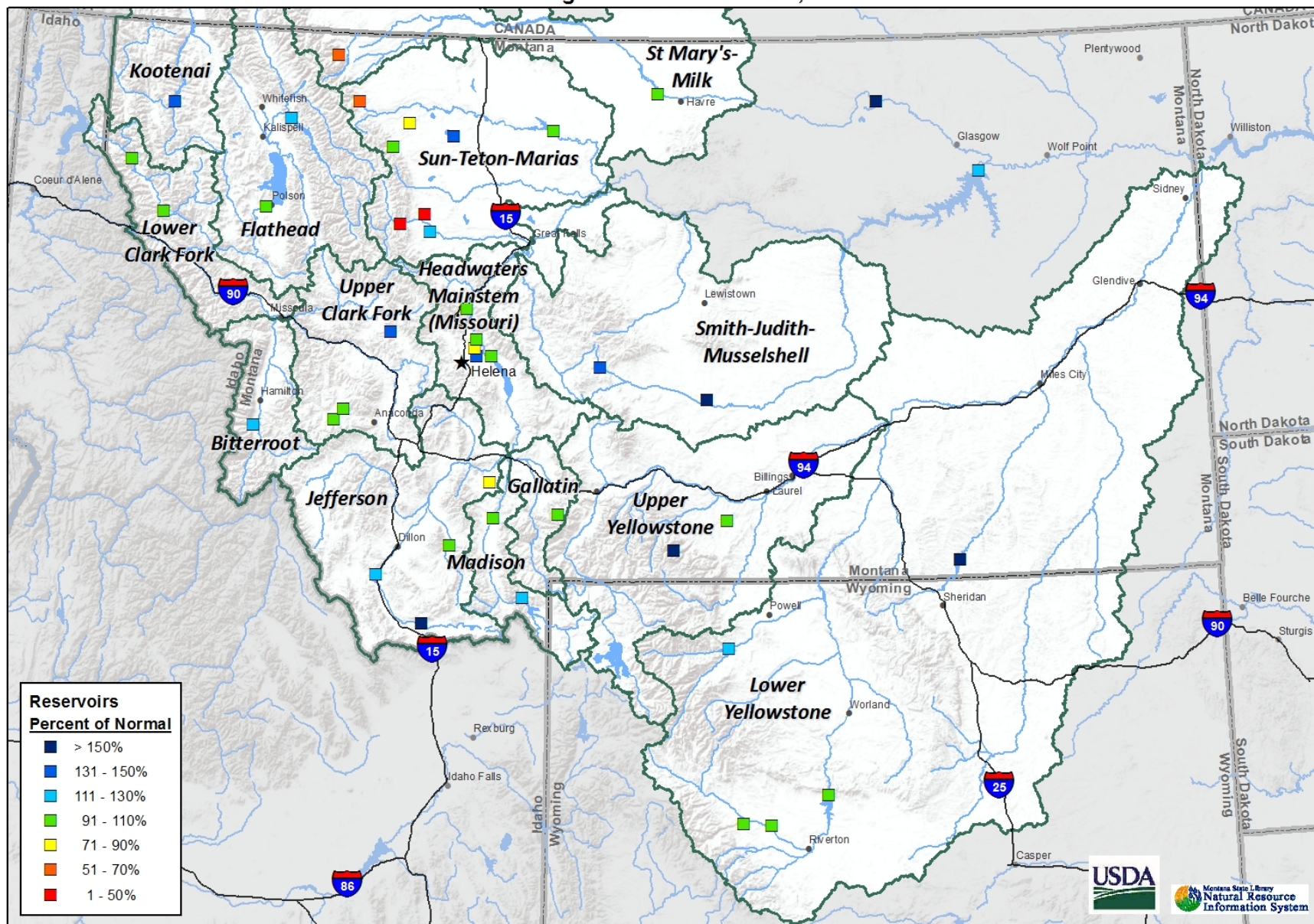
Storage hasn't changed much since last month across the state, with most reservoirs carrying over above average storage from the abundant runoff last year. The one region which has storage which is low for this date is the Rocky Mountain Front. This month, water managers and board members will be making some of the first determinations regarding water allotments in irrigator-controlled reservoir systems across the state. Forecasts for many of these reservoirs indicate enough water to fill many of them given current snowpack conditions, but things can and do change. Another month will help in determining the extent of our water resources this year, and many basins east of the Divide are entering the months that can make or break the water year. The most recent pattern change has been welcomed in helping to improve our runoff prospects this spring, but the coming month or two will set the stage for runoff across the state.

### ***Reservoir Storage***

<b><i>3/1/2019</i></b>	<b><i>% Average</i></b>	<b><i>% Capacity</i></b>	<b><i>% Last Year</i></b>
Columbia River Basin	128	66	111
Kootenai in Montana	149	65	127
Flathead in Montana	114	66	99
Upper Clark Fork	107	75	101
Bitterroot	118	44	63
Lower Clark Fork	97	91	96
Missouri River Basin	115	77	102
Jefferson	127	62	98
Madison	113	82	102
Gallatin	100	53	113
Headwaters Mainstem	117	80	100
Smith-Judith-Musselshell	153	90	113
Sun-Teton-Marias	103	53	106
St. Mary-Milk	98	39	108
Yellowstone River Basin	102	58	101
Upper Yellowstone	121	52	102
Lower Yellowstone	101	58	100
West of Divide	128	66	111
East of Divide	114	75	101
Montana State-Wide	118	73	104



Montana Data Collection Office  
Reservoir Levels  
Percentage of Normal - March 1, 2019

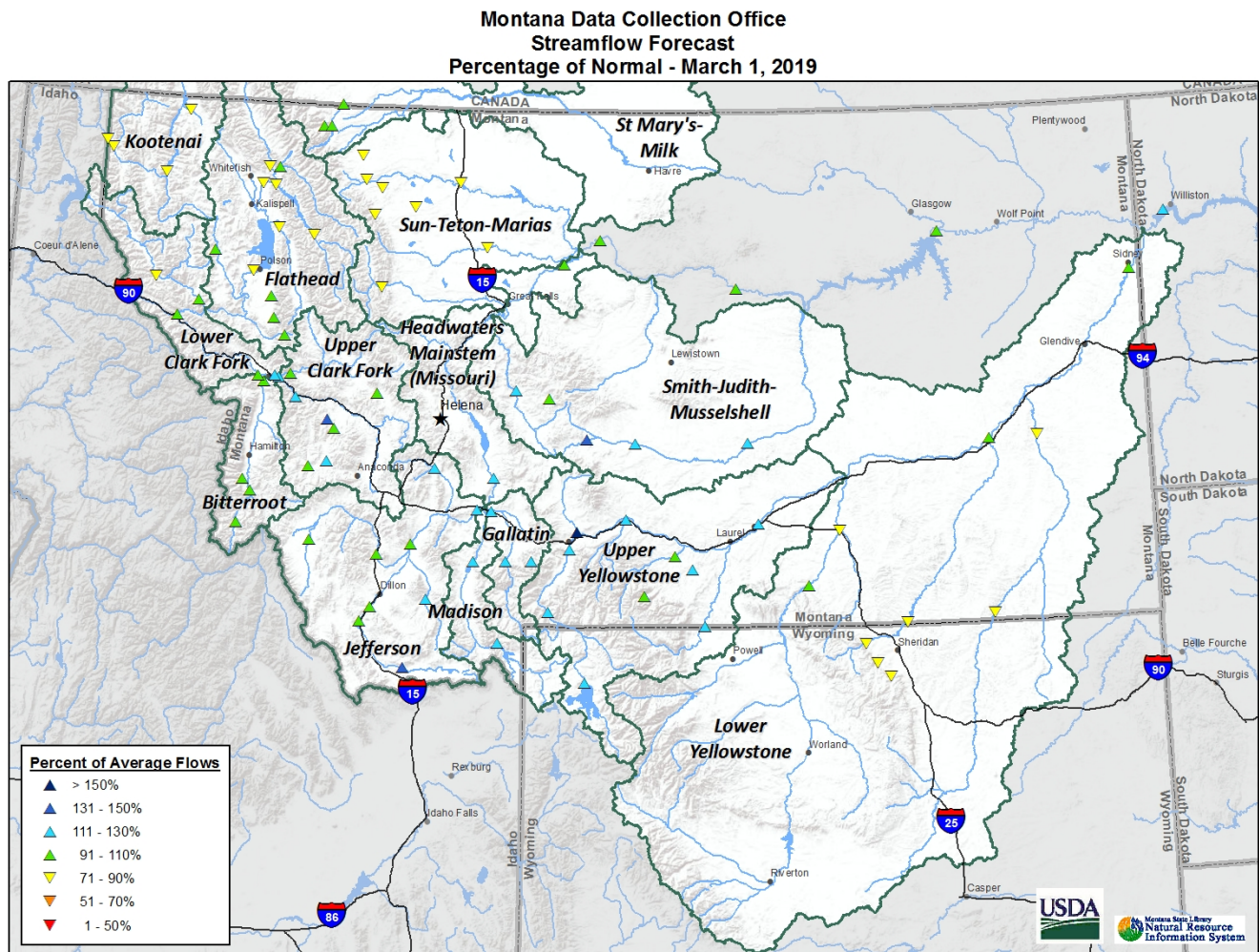




## Streamflow Forecasts - Overview

March 1<sup>st</sup> marks the first official forecasts for rivers and streams in Montana for 2019, and vary widely depending on what part of the state you are looking at. Forecasts in the northern basins are slightly below average for the April 1<sup>st</sup> – July 31<sup>st</sup> period due to below average water year precipitation and snowpack that is slightly below normal for March 1<sup>st</sup>. As you move south in the state, snowpack conditions improve and so do the streamflow prospects. A few rivers have forecasts which are well above average on March 1<sup>st</sup>, but these are mainly east of the Divide where the remaining months of March through May typically contribute a significant portion (>25%) to the annual peak snowpack. Time remains for improvement, or decline, in snowpack and we'll have a better picture of what to expect when we issue the April 1<sup>st</sup> forecasts.

As noted above, streamflow forecasts will be displayed in the basin narrative sections below in a new format. We are looking for feedback on this new format and welcome all comments.



## Kootenai River Basin



February began with relatively warm temperatures in the Kootenai River basin. During the first couple days of the month daily minimum temperatures were above freezing at up to 5000 ft and it rained at several SNOTEL sites. By the end of the first week temperatures had cooled significantly, and precipitation arrived as snow. Snow trickled in consistently the remainder of the month. See data from [Poorman Creek SNOTEL](#). Overall, precipitation was slightly above average during February, which helped the basin recover from lack of total water year-to-date precipitation. Currently, most of the Kootenai River basin is designated under D0 (abnormally dry) conditions by the [US Drought Monitor](#), which is a slightly improvement from a month ago. The other good news is that there is still at least month left of the typical snow accumulation season and time for improvement.

### Kootenai River Basin Data Summary

#### Snowpack

	Percent of 1981-2010 Normal (Median)	Last Year Percentage of Normal (Median)
KOOTENAY in CANADA	86%	116%
KOOTENAI MAINSTEM	80%	110%
TOBACCO	91%	126%
FISHER	110%	135%
YAAK	94%	130%
KOOTENAI RIVER BASIN in MONTANA	91%	122%
KOOTENAI ab BONNERS FERRY	91%	122%
<b>Basin-Wide Snowpack</b>	<b>91%</b>	<b>122%</b>

#### Precipitation

	Monthly Percentage of Average	WYTD Percentage of 1981- 2010 Average*	WYTD Last Year Percentage of Average
Mountain Precipitation	107%	82%	117%
Valley Precipitation	264%	105%	142%
<b>Basin-Wide Precipitation</b>	<b>110%</b>	<b>82%</b>	<b>117%</b>

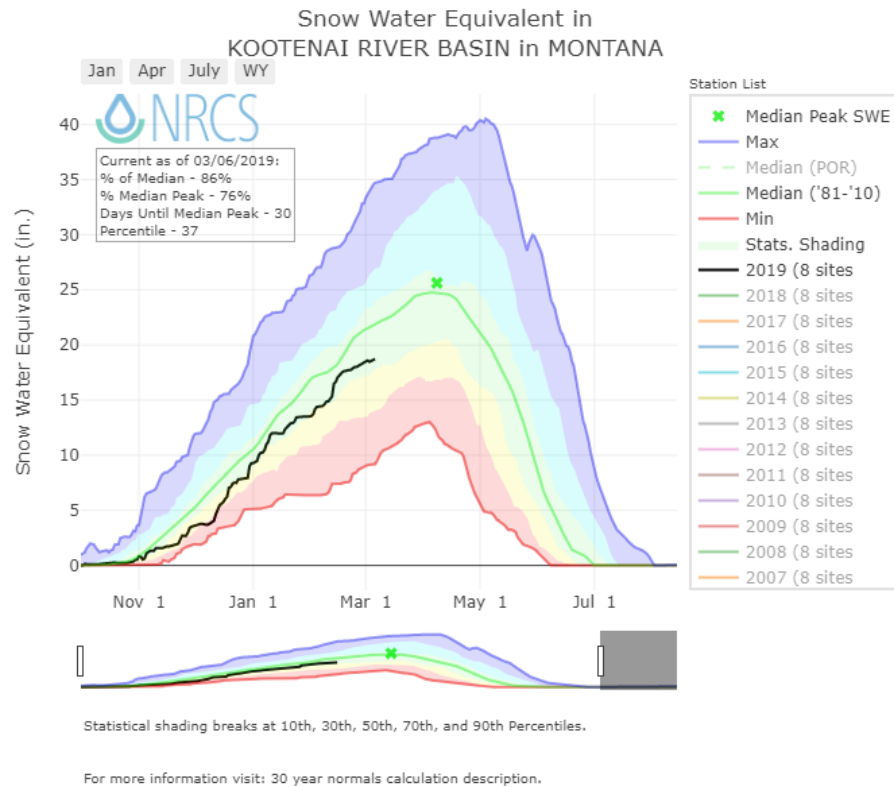
\*WYTD Precipitation is October 1st- Current

#### Reservoir Storage

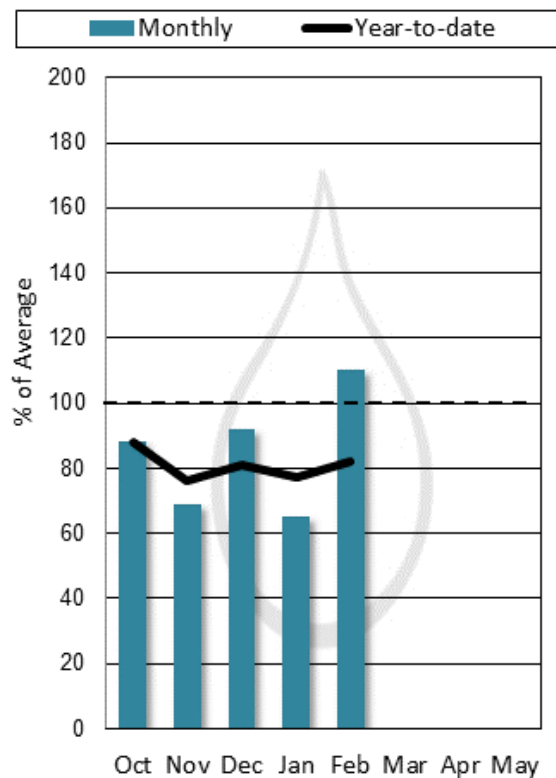
	Percentage of Average	Percentage of Capacity (Total)	Last Year Percentage of Average
<b>Basin-Wide Reservoir Storage</b>	<b>149%</b>	<b>65%</b>	<b>117%</b>

\*See Reservoir Storage Table for storage in individual reservoirs

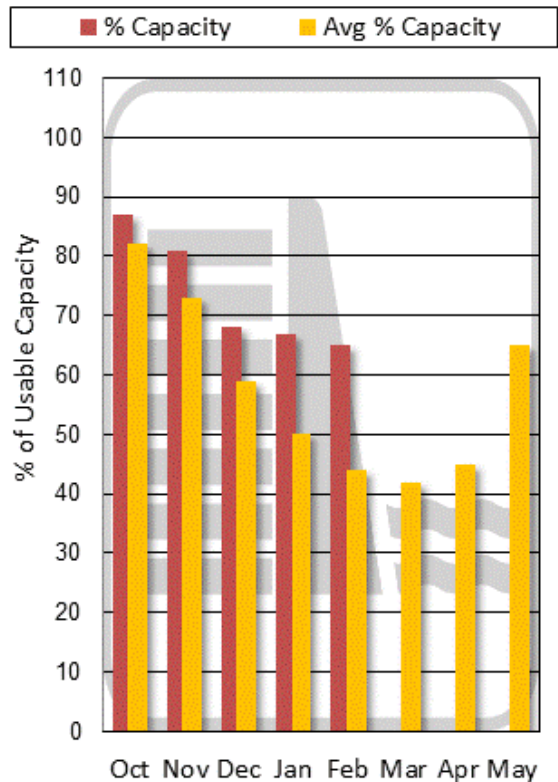
(click on chart below to navigate to [online version](#) with additional features)



### Mountain and Valley Precipitation



### End of Month Reservoir Storage



Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.



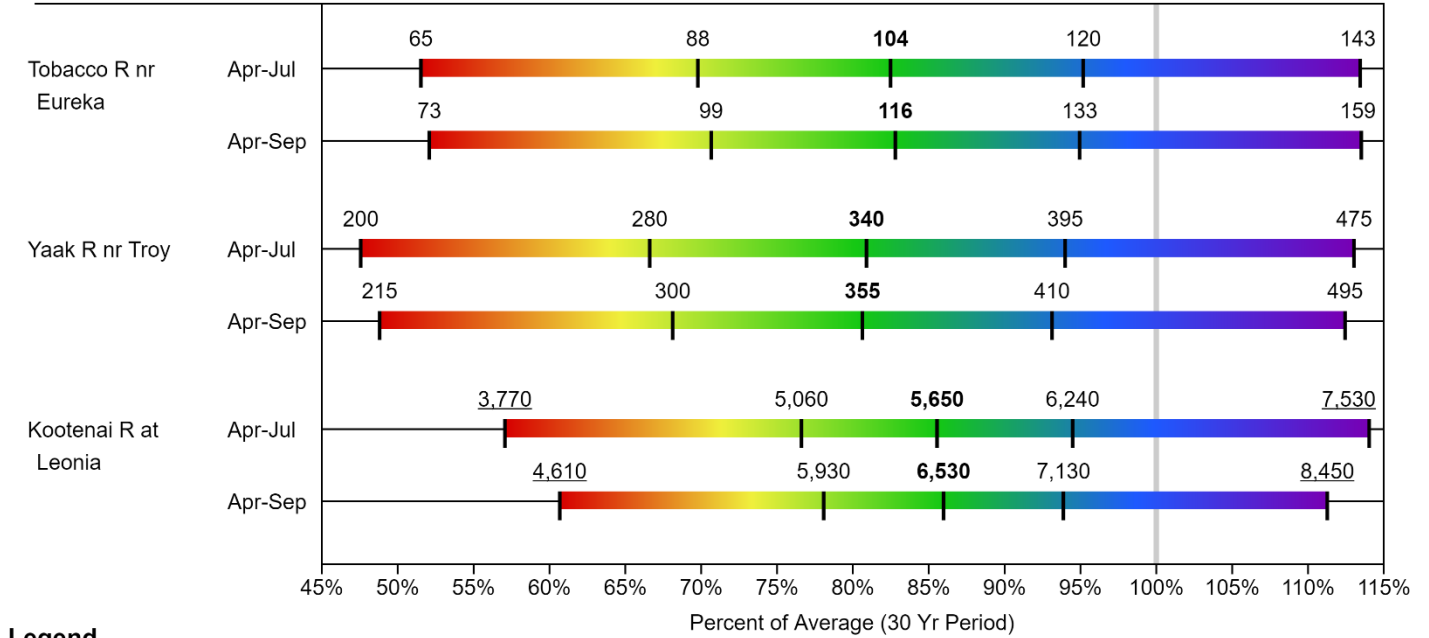
# KOOTENAI RIVER BASIN in MONTANA

## Water Supply Forecasts

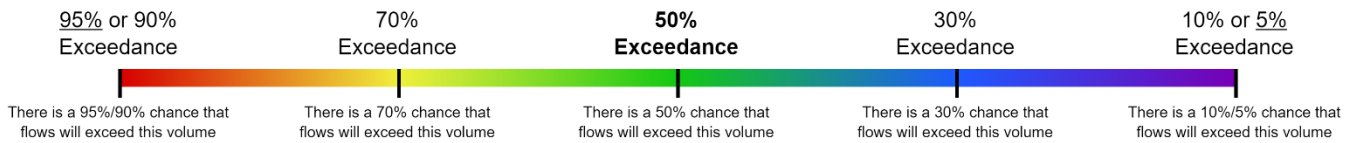
### March 1, 2019

#### Forecast Exceedance Probabilities

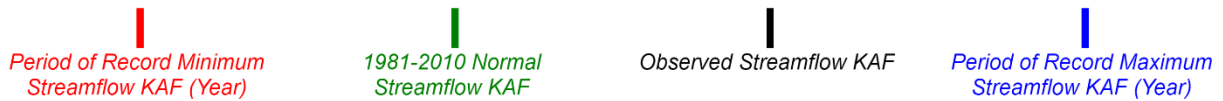
<----- Drier ----- Future Conditions ----- Wetter ----->  
 Labels on chart represent volumes of water expressed in thousand acre-feet.



#### Legend

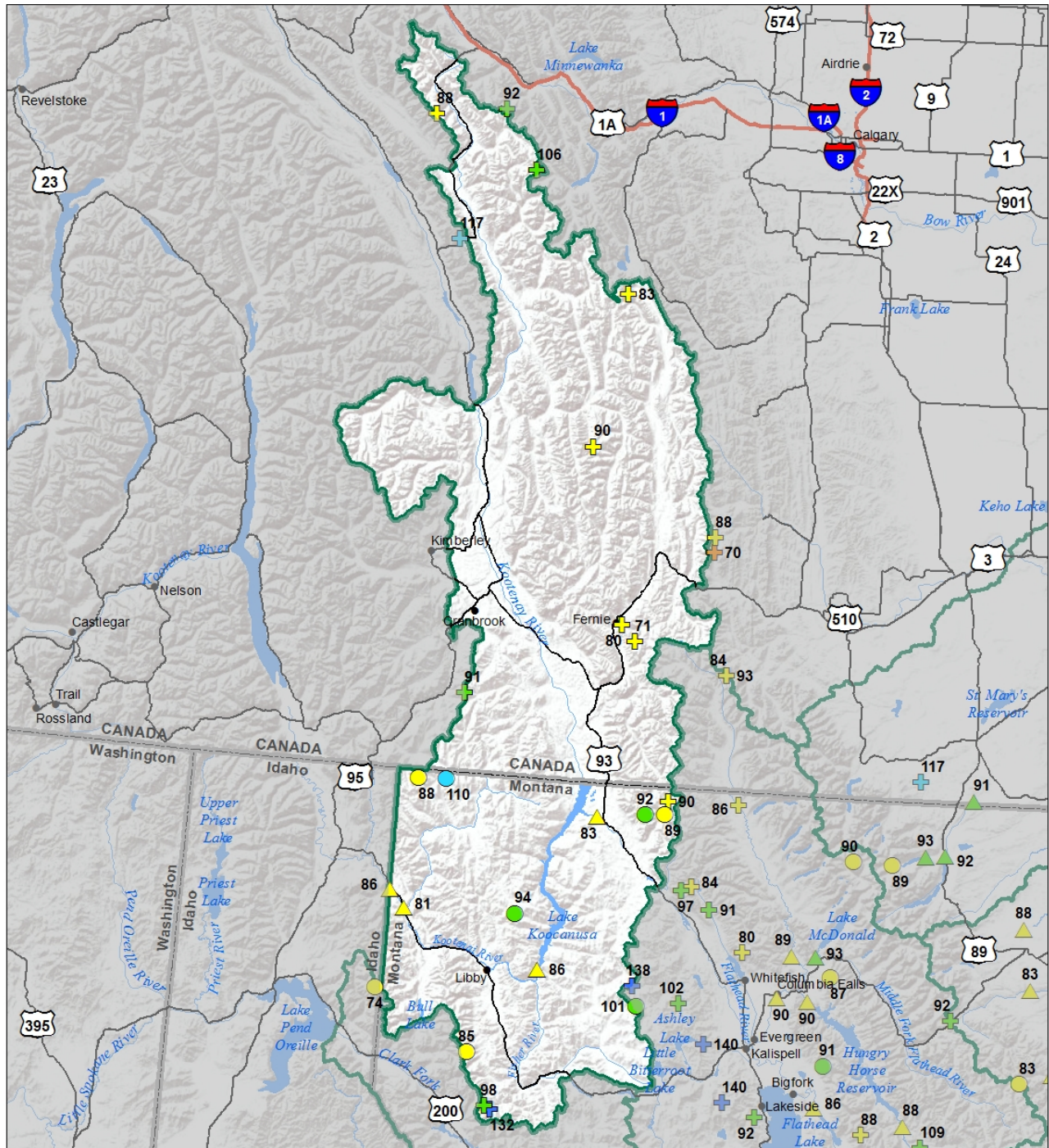


When selected, the following historic streamflow values and statistics will be shown.



Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

# Kootenai River Basin Streamflow Forecast, Snow Water Equivalent Percentage of Normal March 1, 2019



## **Snow Water Equivalent Percent of Normal**

### **SNOTEL**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%
- \*

### **Snowcourse**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%
- \*

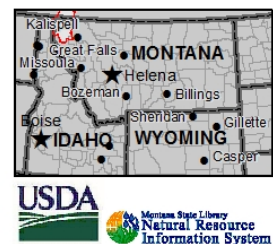
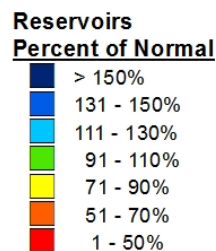
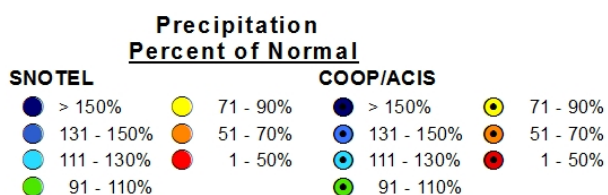
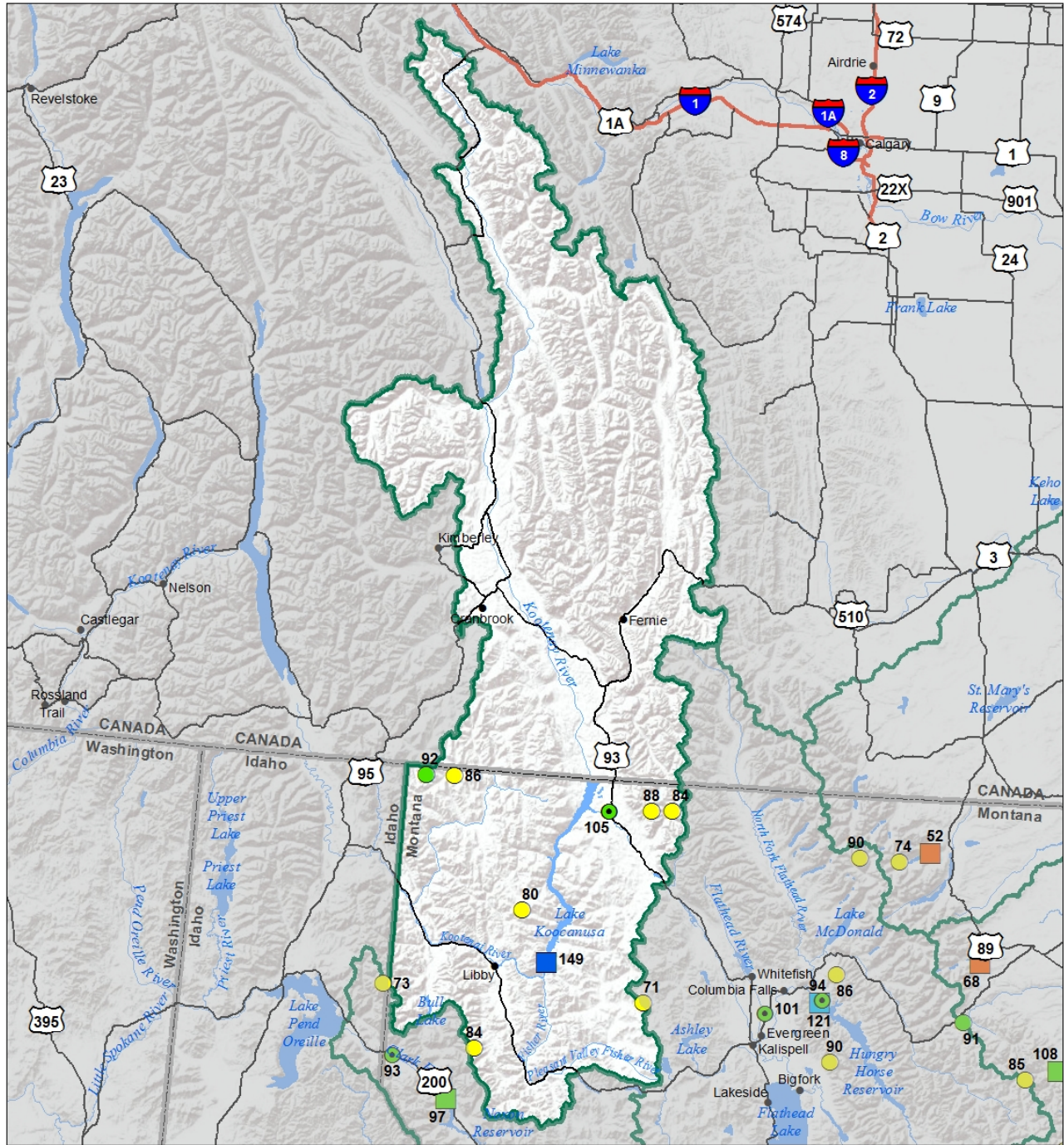
## **Streamflow Forecast Percent of Average Flows**

- ▲ > 150%
- ▲ 131 - 150%
- ▲ 111 - 130%
- ▲ 91 - 110%
- ▲ 71 - 90%
- ▲ 51 - 70%
- ▲ 1 - 50%



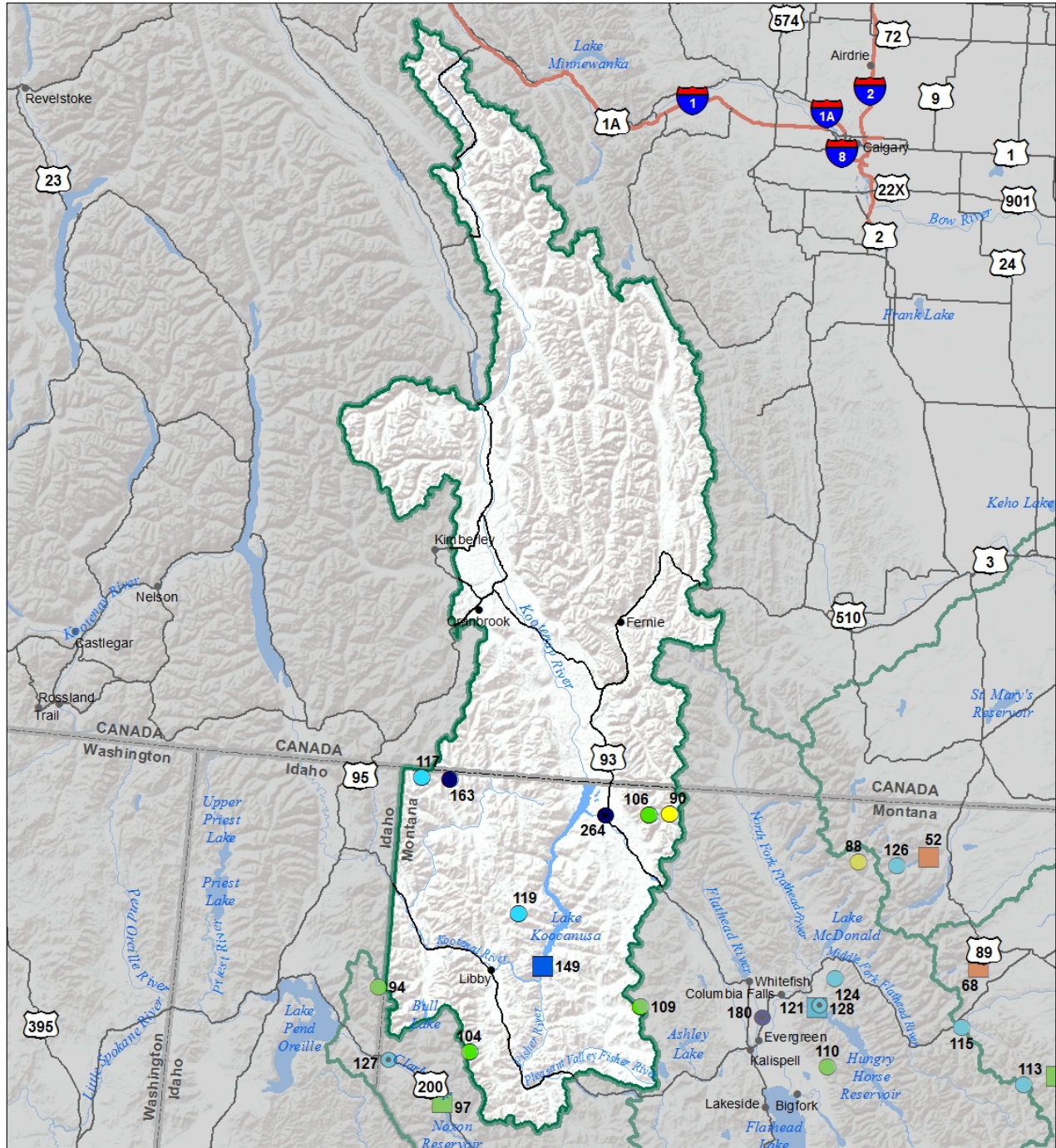


**Kootenai River Basin**  
**Water Year to Date Precipitation and Reservoir Levels**  
**Percentage of Normal**  
**March 1, 2019**





**Kootenai River Basin**  
**Monthly Precipitation and Reservoir Levels**  
**Percentage of Normal**  
**March 1, 2019 (February 1, 2019 - March 1, 2019)**



**Precipitation**  
**Percent of Normal**

**SNOTEL**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

**COOP/ACIS**

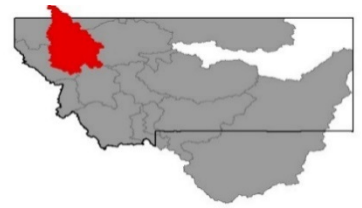
- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

**Reservoirs**  
**Percent of Normal**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%







## Flathead River Basin

February brought above average precipitation to the Flathead River basin which helped the basin recover from below average Fall precipitation. So far this water year October and February are the only 2 months that received above average precipitation. Much of the February precipitation came during the first part of the month, while the last week brought cold and mostly clear weather. Lower elevations did not lack snowfall in February. Several of the basin's lower elevation snow stations received record accumulation during the month. See the [Interactive Map](#). [Bisson Creek SNOTEL](#) is one example, setting a record for largest February snow water accumulation over 28 years of record. It received 4.1 inches of snow water, which is about double the water it normally receives. The basin-wide snowpack normally peaks in mid-April. Higher elevation sites typically peak in May. With that said, the basin wide snowpack is currently slightly below normal, but there is still time for improvement.

### Flathead River Basin Data Summary

<b>Snowpack</b>	<b>Percent of 1981-2010 Normal (Median)</b>	<b>Last Year Percentage of Normal (Median)</b>
NF FLATHEAD in CANADA	93%	158%
NF FLATHEAD in MONTANA	88%	126%
MIDDLE FORK FLATHEAD	88%	138%
SOUTH FORK FLATHEAD	90%	158%
STILLWATER-WHITEFISH	95%	121%
SWAN	89%	152%
MISSION VALLEY	100%	137%
LITTLE BITTERROOT-ASHLEY	114%	107%
JOCKO	98%	138%
FLATHEAD in MONTANA	93%	137%
<b>Basin-Wide Snowpack</b>	<b>93%</b>	<b>138%</b>

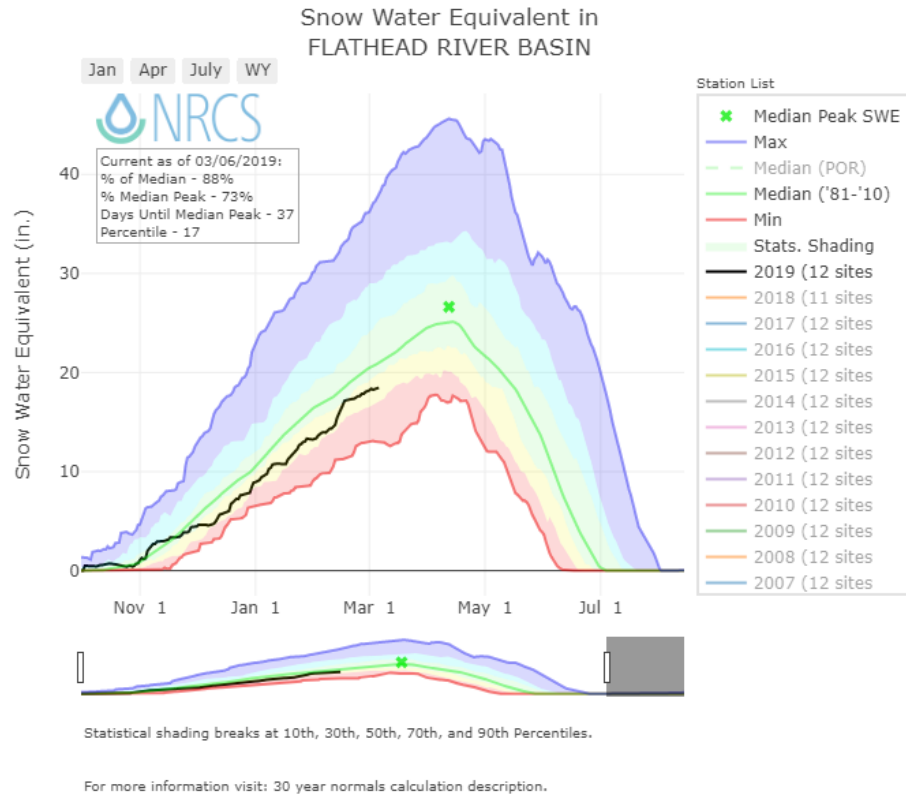
<b>Precipitation</b>	<b>Monthly Percentage of Average</b>	<b>WYTD Percentage of 1981-2010 Average*</b>	<b>WYTD Last Year Percentage of Average</b>
Mountain Precipitation	117%	93%	134%
Valley Precipitation	235%	114%	124%
<b>Basin-Wide Precipitation</b>	<b>120%</b>	<b>94%</b>	<b>134%</b>

\*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

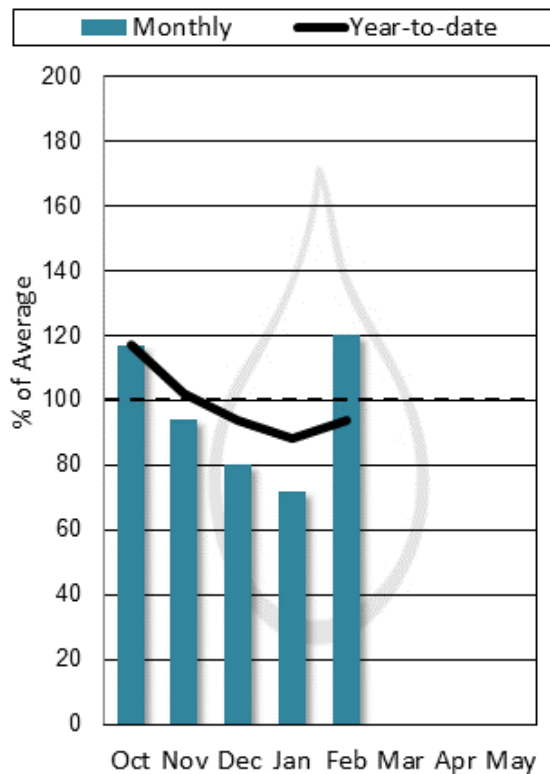
<b>Reservoir Storage</b>	<b>Percentage of Average</b>	<b>Percentage of Capacity (Total)</b>	<b>Last Year Percentage of Average</b>
<b>Basin-Wide Reservoir Storage</b>	<b>114%</b>	<b>66%</b>	<b>115%</b>

\*See Reservoir Storage Table for storage in individual reservoirs

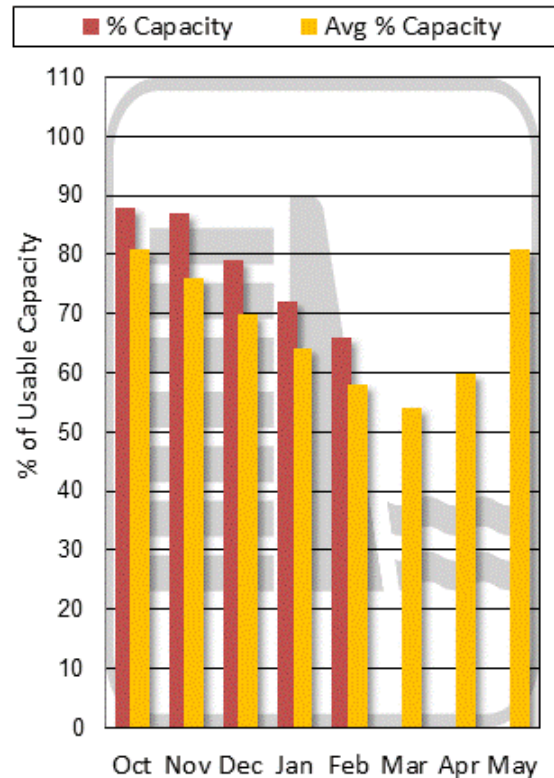
(click on chart below to navigate to [online version](#) with additional features)



### Mountain and Valley Precipitation



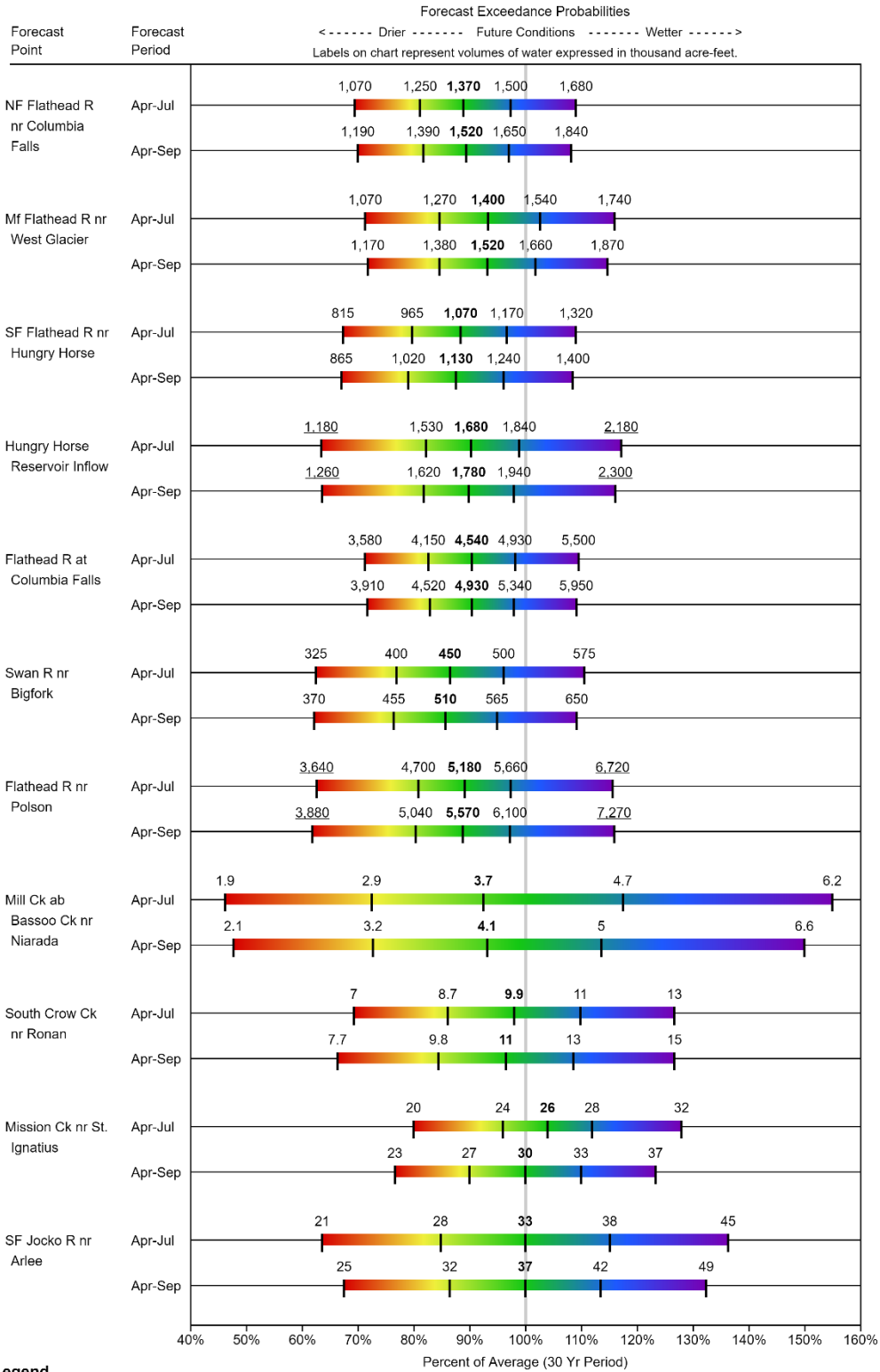
### End of Month Reservoir Storage



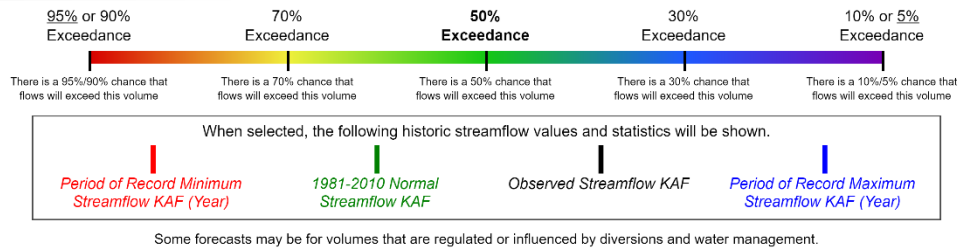
Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.



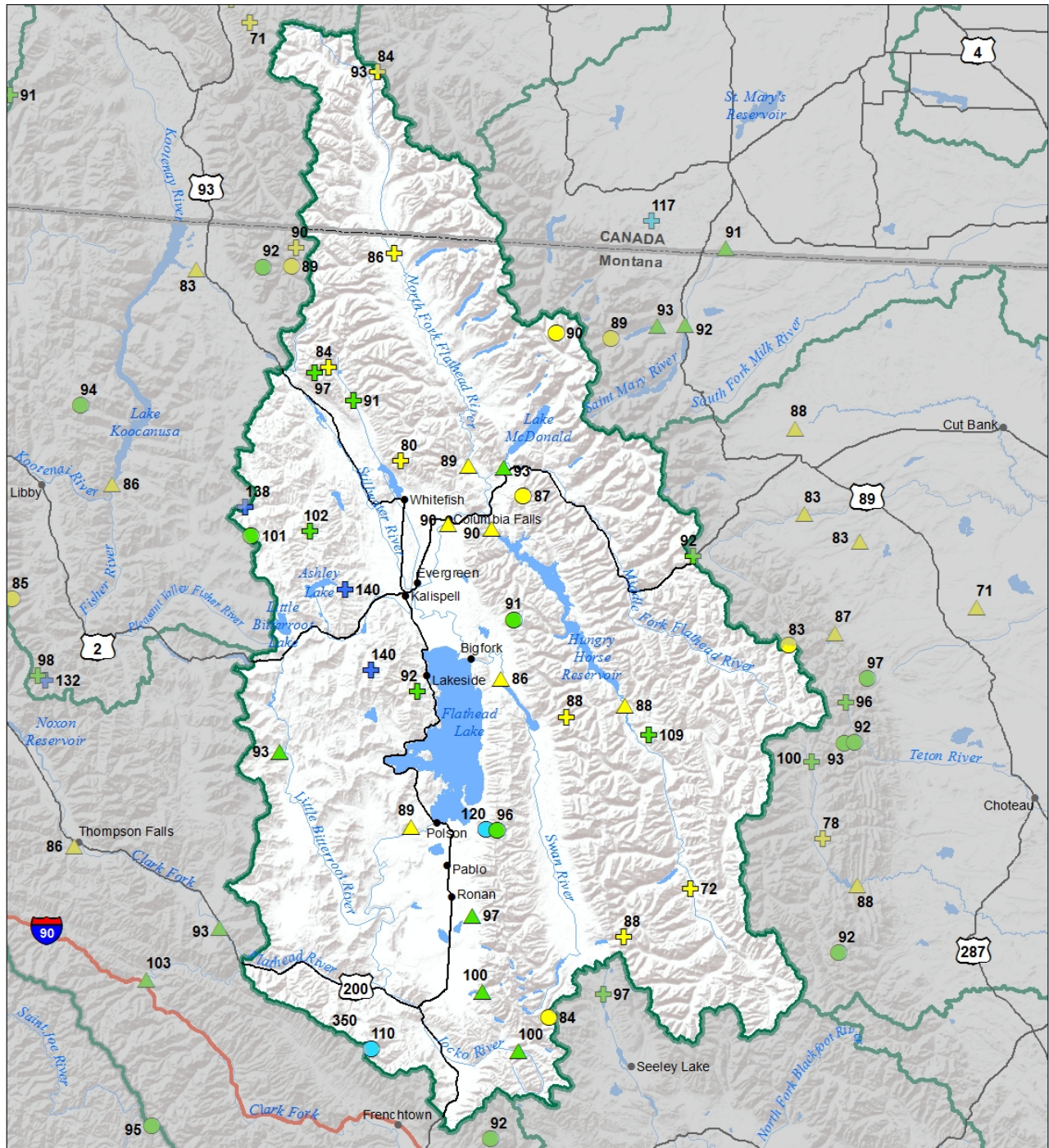
**FLATHEAD RIVER BASIN**  
**Water Supply Forecasts**  
**March 1, 2019**



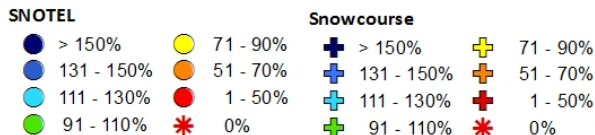
**Legend**



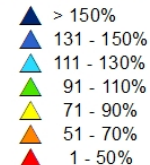
# Flathead River Basin Streamflow Forecast, Snow Water Equivalent Percentage of Normal March 1, 2019



## **Snow Water Equivalent Percent of Normal**

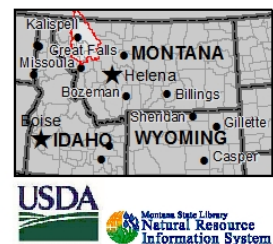
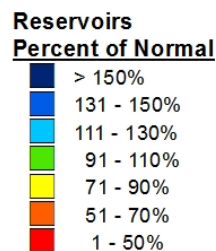
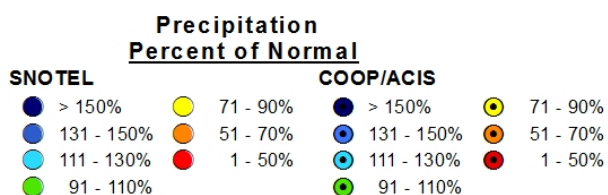
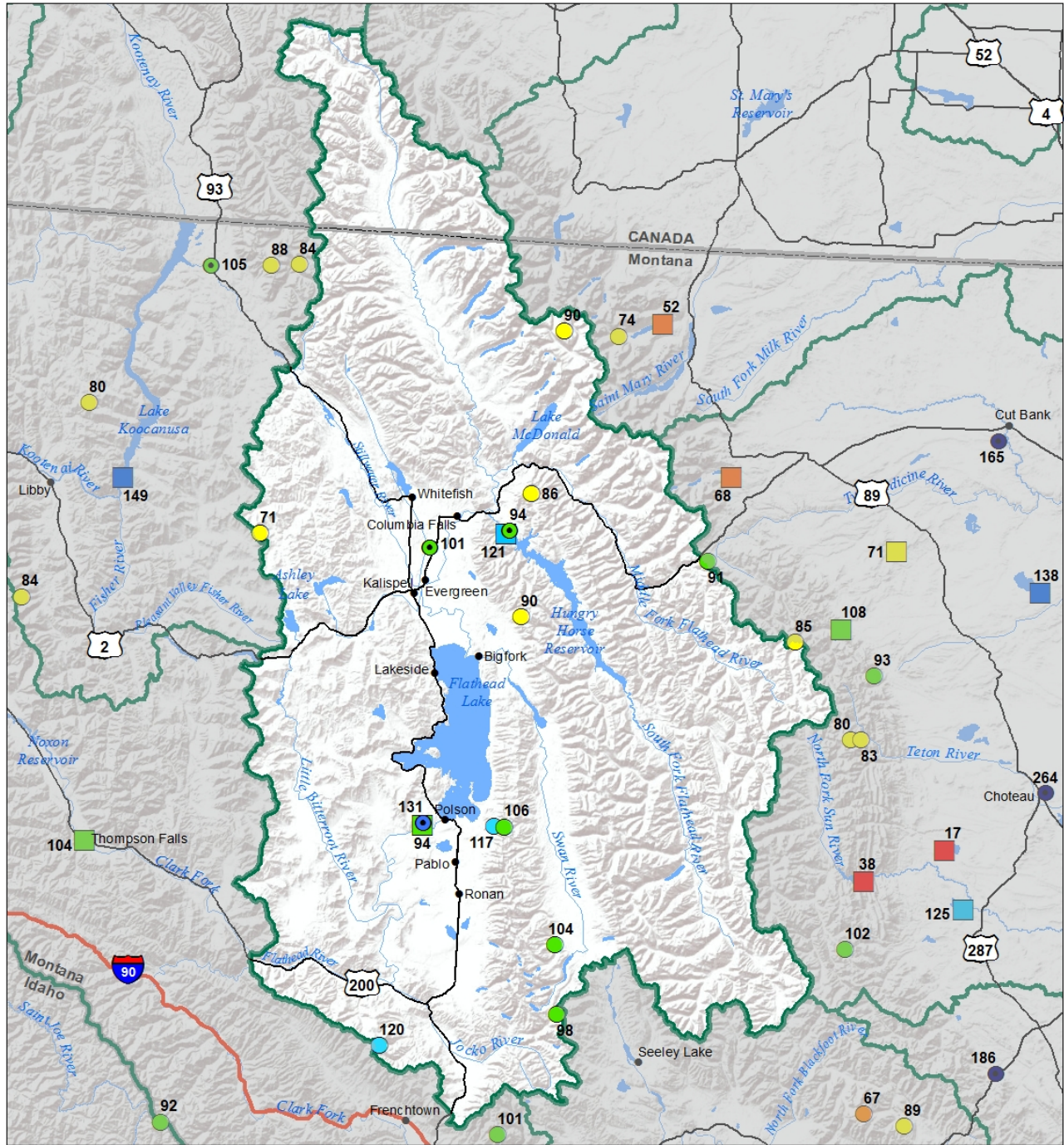


## **Streamflow Forecast Percent of Average Flows**



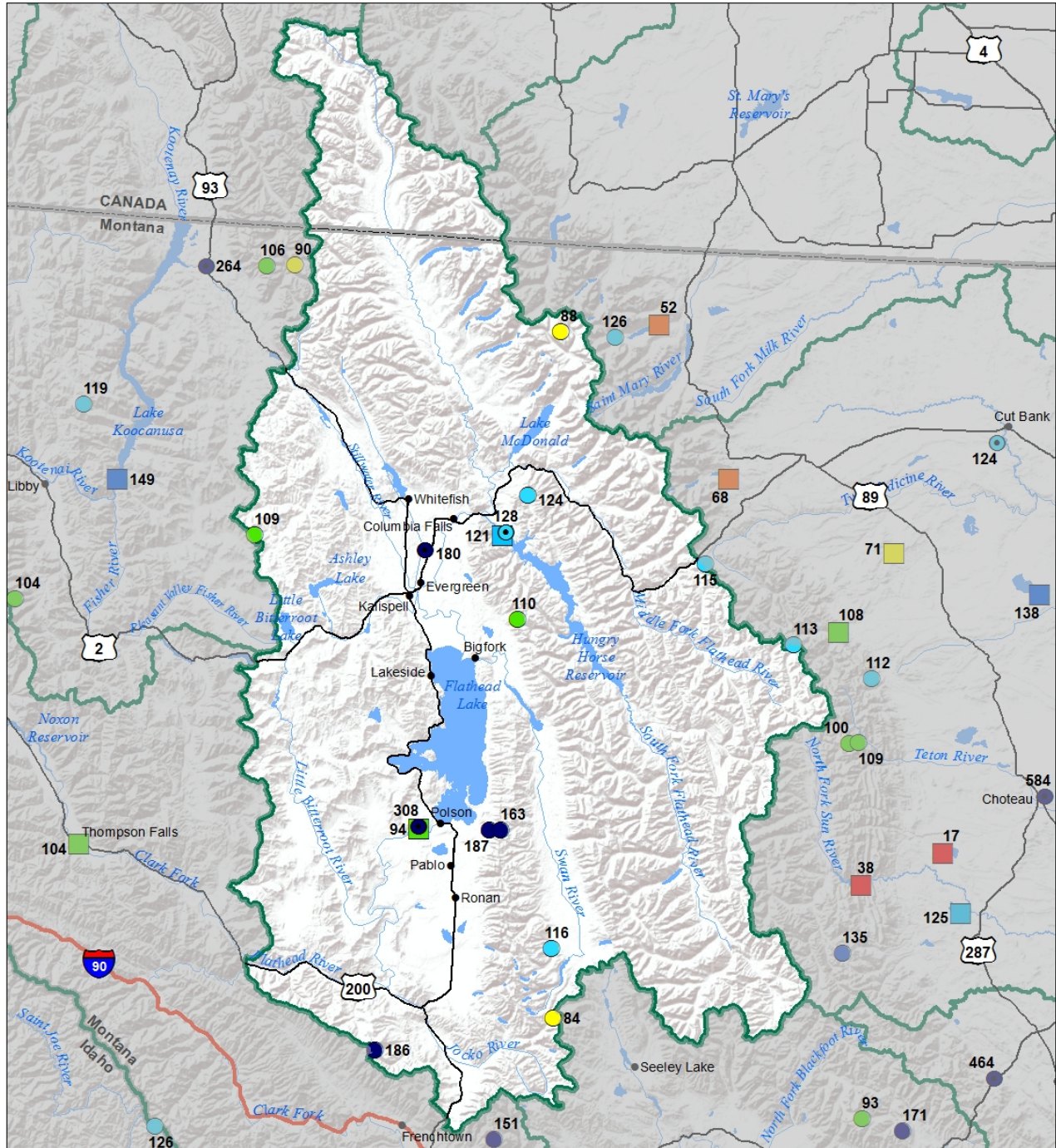


# Flathead River Basin Water Year to Date Precipitation and Reservoir Levels Percentage of Normal March 1, 2019





**Flathead River Basin**  
**Monthly Precipitation and Reservoir Levels**  
**Percentage of Normal**  
**March 1, 2019 (February 1, 2019 - March 1, 2019)**



**Precipitation  
Percent of Normal**

**SNOTEL**

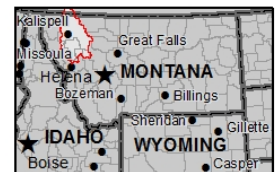
- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

**COOP/ACIS**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%

**Reservoirs  
Percent of Normal**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%





# Upper Clark Fork River Basin



The Upper Clark Fork River basin received well above average precipitation in February and the snowpack is currently above normal. This is a major rebound from below average conditions last month. Several snow stations set records for total February snowfall. This includes [Basin Creek SNOTEL](#) which received the most February snowfall in 39 years of record. All 4 Snow Courses located within the Lubrecht Forest received their second highest February snowfall, falling only behind February 2014. See the [Interactive Map](#). Temperatures were cold and significant snow fell at all elevations during the month. Residents of the Upper Clark Fork River basin are reporting they have the most valley snow in recent memory. There is just over a month left of the basin's typical snow accumulation season and normal March precipitation would likely mean ample water supply heading into snowmelt season.

## Upper Clark Fork River Basin Data Summary

<b>Snowpack</b>	<b>Percent of 1981-2010 Normal (Median)</b>	<b>Last Year Percentage of Normal (Median)</b>
CLARK FORK ab FLINT CREEK	122%	172%
FLINT CREEK	130%	157%
ROCK CREEK	117%	148%
CLARK FORK ab BLACKFOOT	122%	163%
BLACKFOOT	107%	159%
<b>Basin-Wide Snowpack</b>	<b>116%</b>	<b>161%</b>

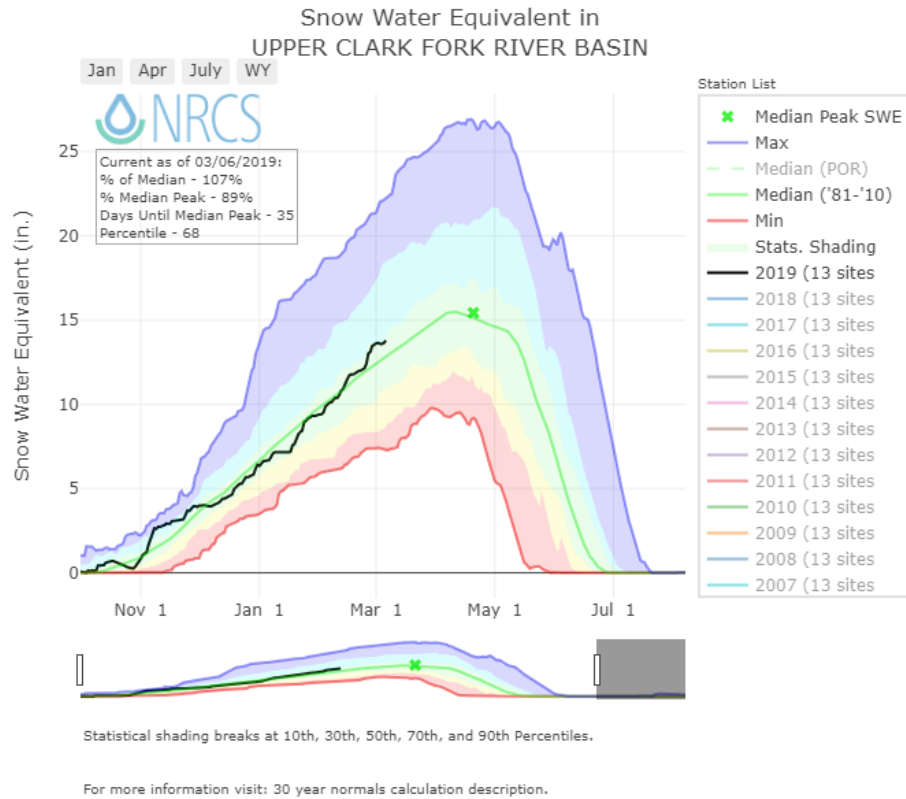
<b>Precipitation</b>	<b>Monthly Percentage of Average</b>	<b>WYTD Percentage of 1981-2010 Average*</b>	<b>WYTD Last Year Percentage of Average</b>
Mountain Precipitation	147%	104%	136%
Valley Precipitation	244%	101%	99%
<b>Basin-Wide Precipitation</b>	<b>148%</b>	<b>104%</b>	<b>136%</b>

\*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

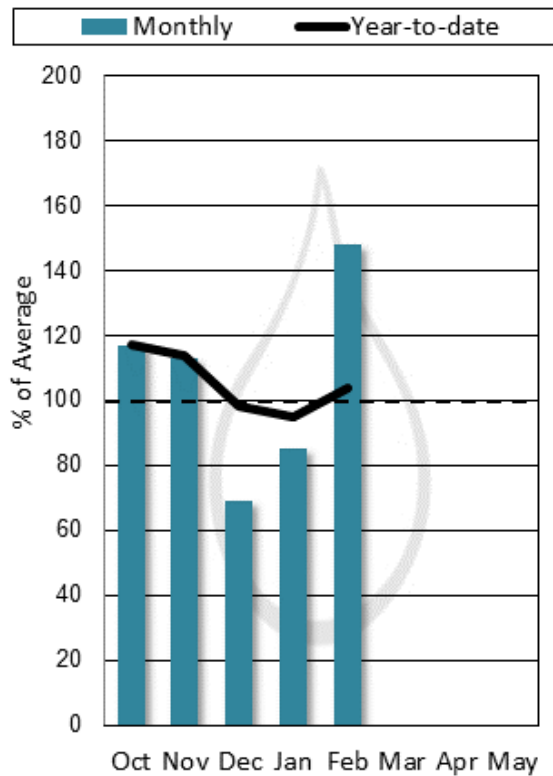
<b>Reservoir Storage</b>	<b>Percentage of Average</b>	<b>Percentage of Capacity (Total)</b>	<b>Last Year Percentage of Average</b>
<b>Basin-Wide Storage</b>	<b>107%</b>	<b>75%</b>	<b>106%</b>

\*See Reservoir Storage Table for storage in individual reservoirs

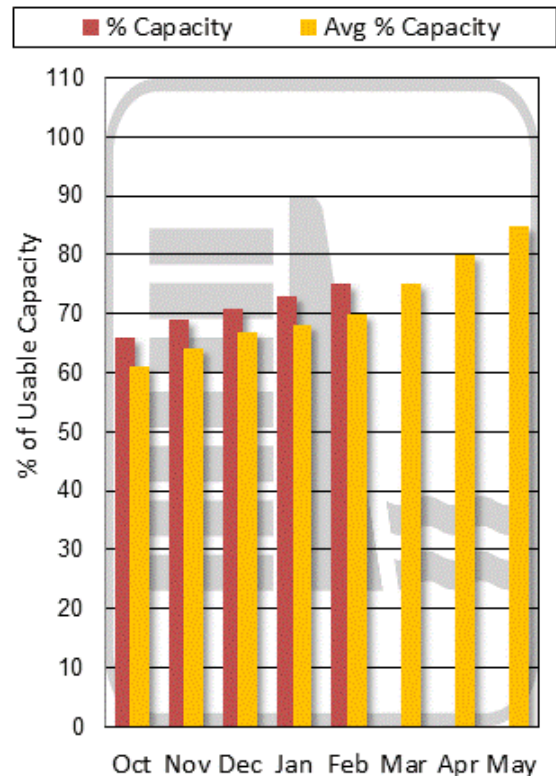
(click on chart below to navigate to [online version](#) with additional features)



### Mountain and Valley Precipitation



### End of Month Reservoir Storage



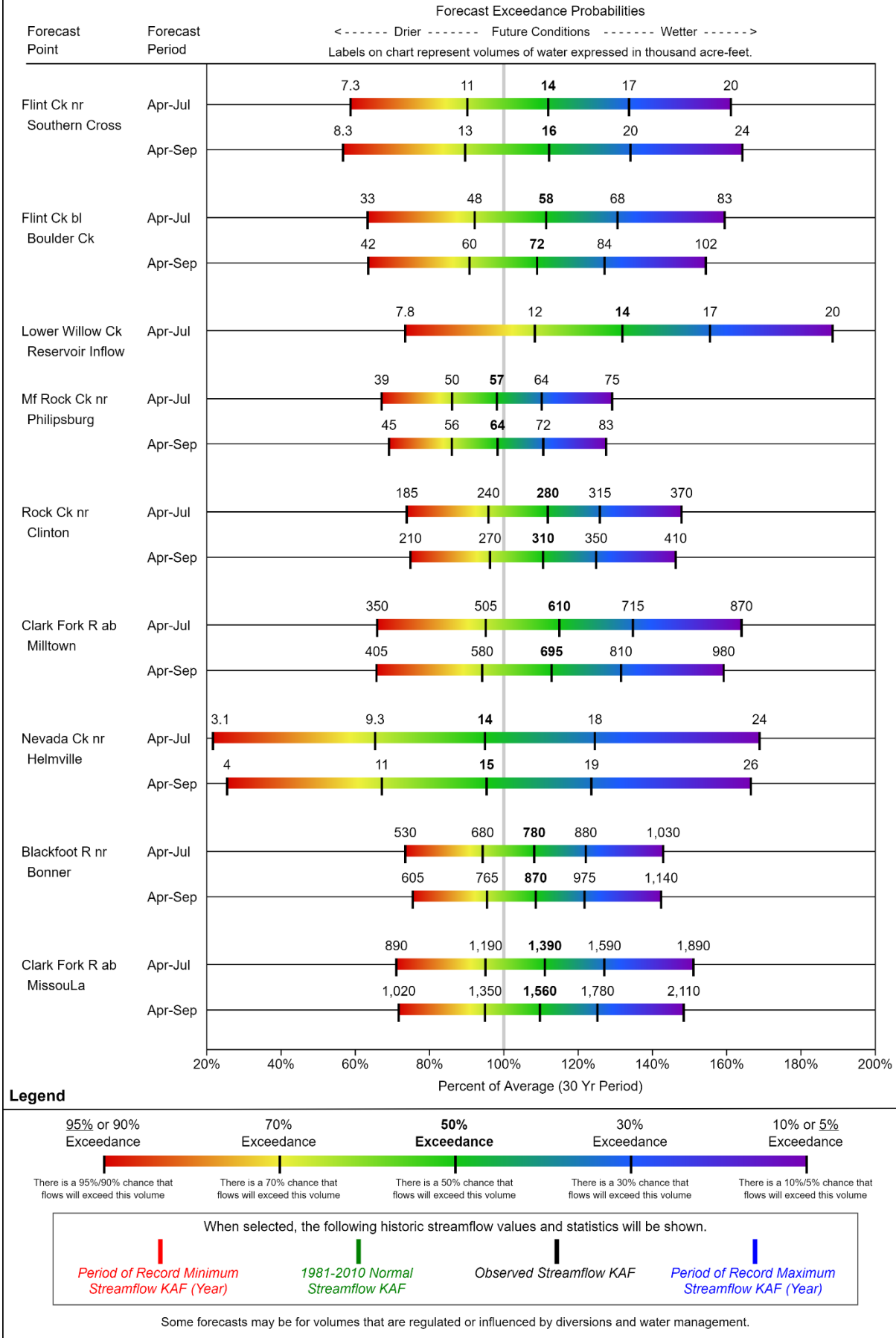
Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.



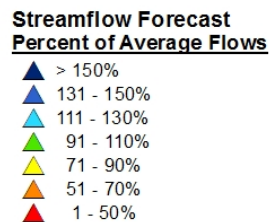
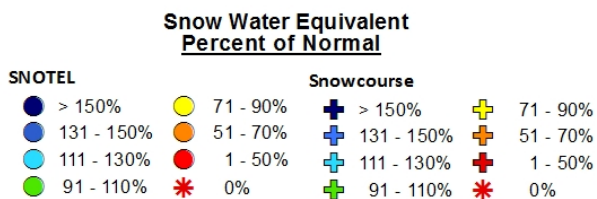
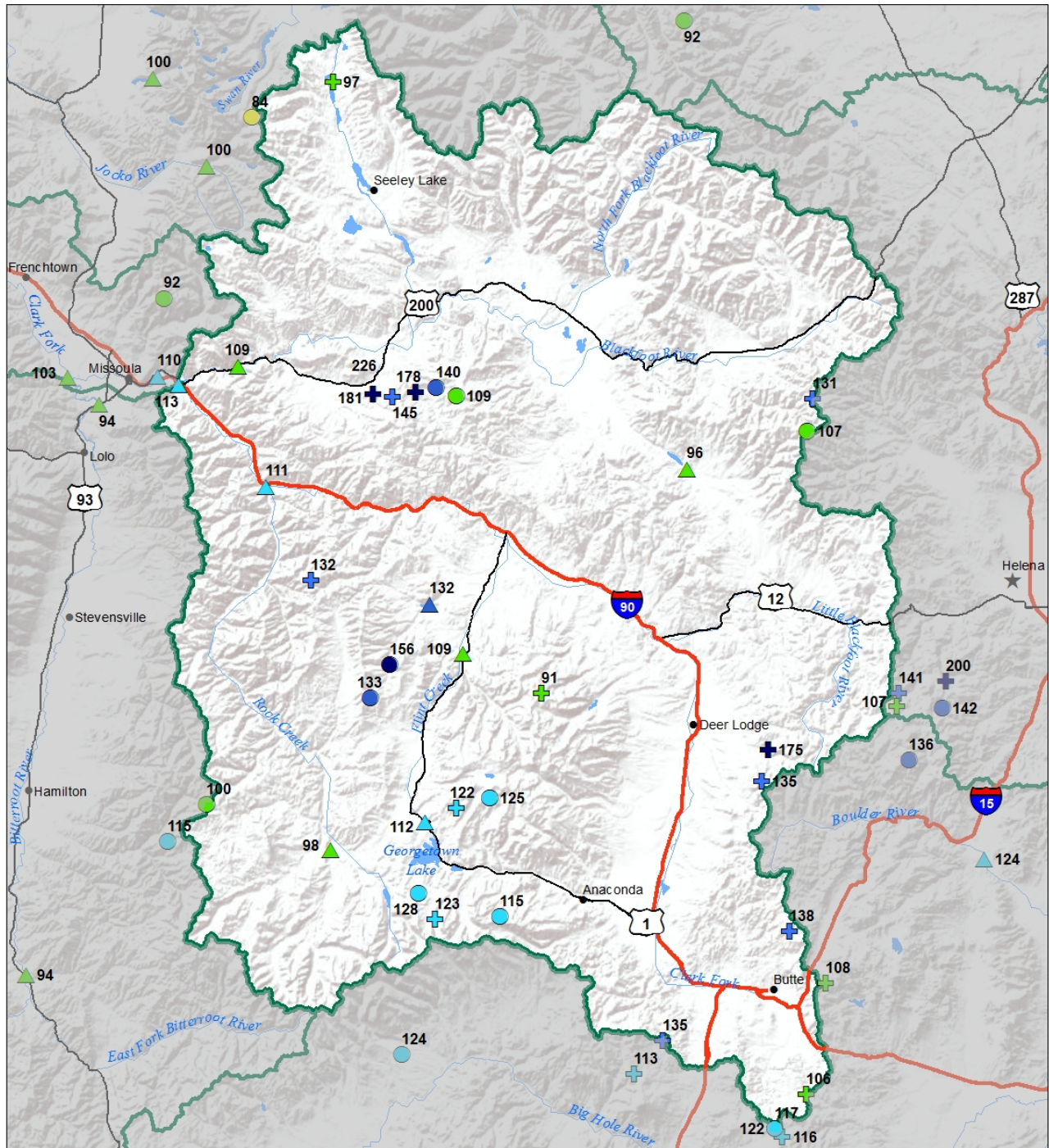
# UPPER CLARK FORK RIVER BASIN

## Water Supply Forecasts

March 1, 2019

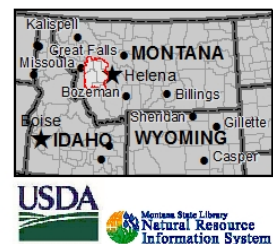
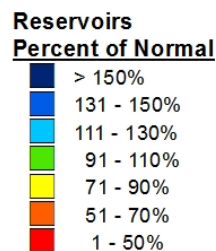
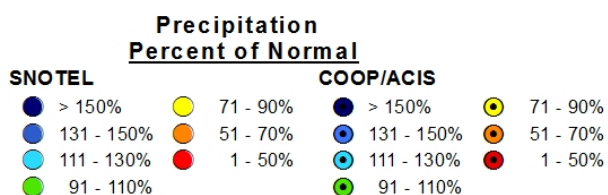
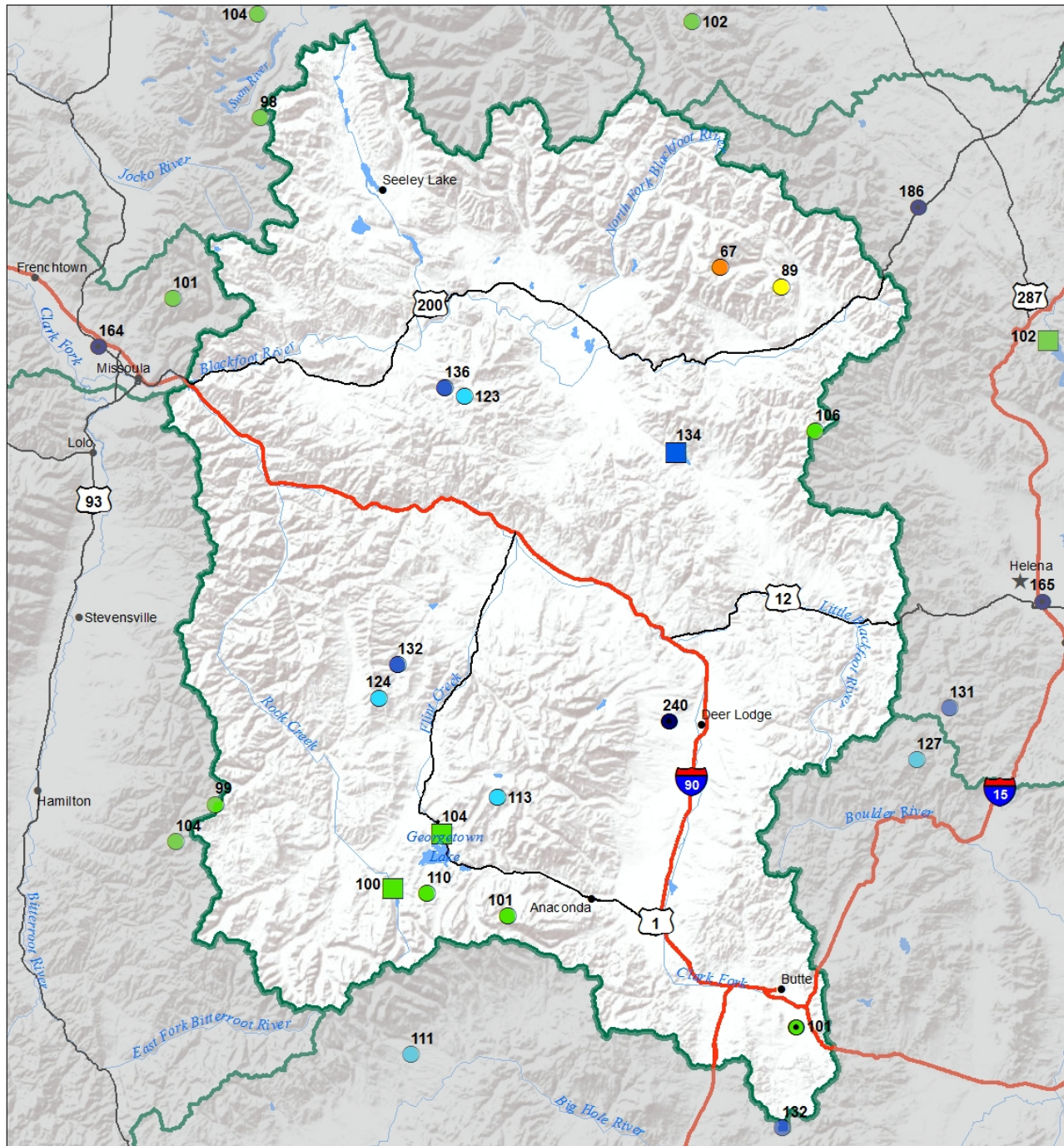


**Upper Clark Fork River Basin  
Streamflow Forecast, Snow Water Equivalent  
Percentage of Normal  
March 1, 2019**



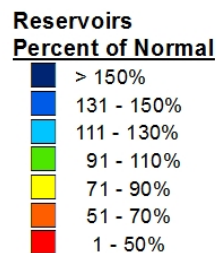
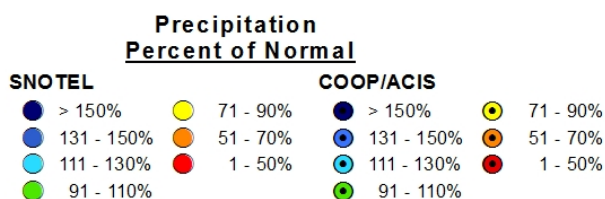
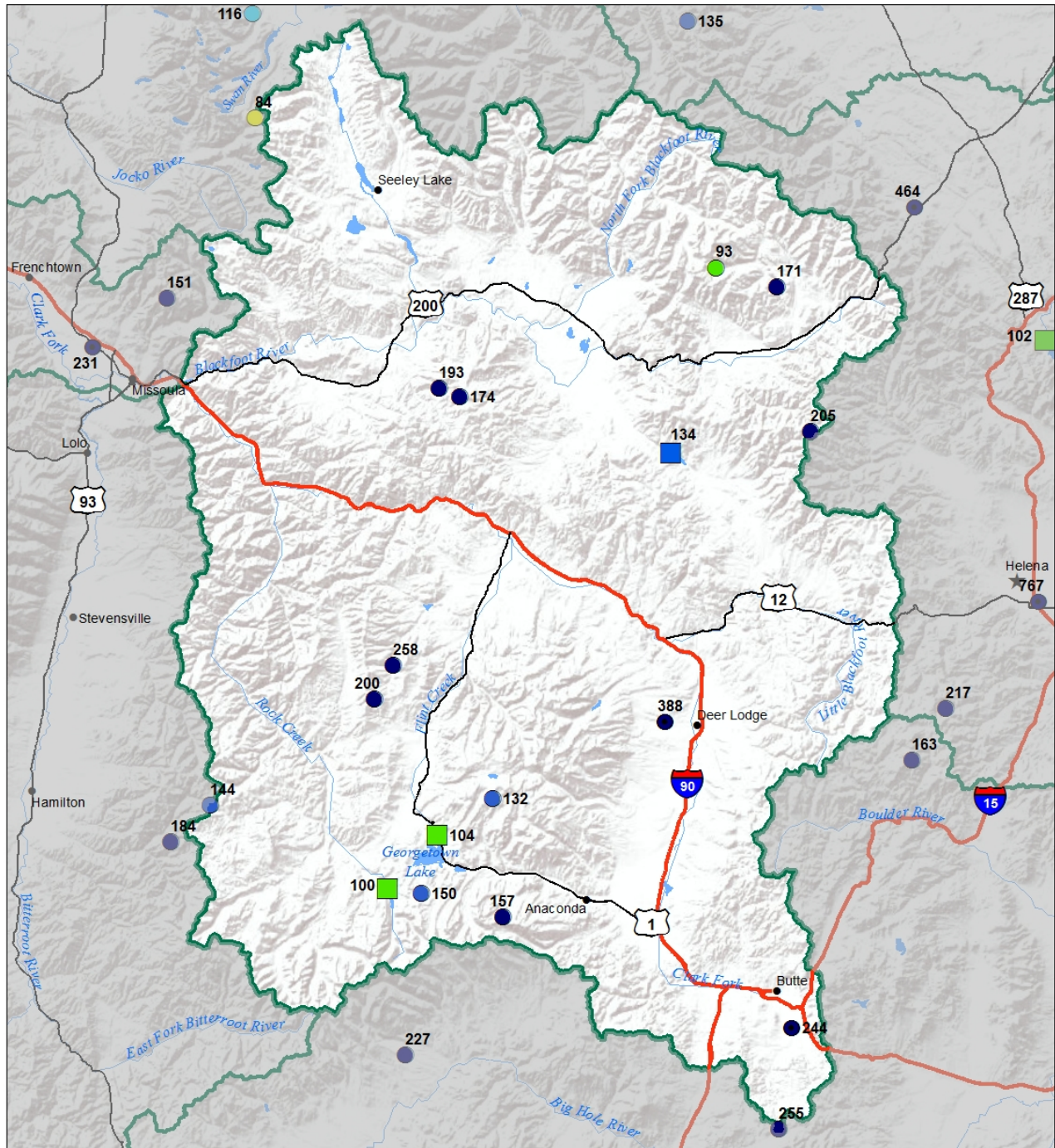


**Upper Clark Fork River Basin**  
**Water Year to Date Precipitation and Reservoir Levels**  
**Percentage of Normal**  
**March 1, 2019**





**Upper Clark Fork River Basin  
Monthly Precipitation and Reservoir Levels  
Percentage of Normal  
March 1, 2019 (February 1, 2019 - March 1, 2019)**





## Bitterroot River Basin



Water year to date precipitation is currently at near normal conditions in the Bitterroot River basin. This is partially due to the significant amount of snow the basin received during February. All SNOTEL sites in the basin received over 150% of their typical February accumulation. This includes Lost Trail Pass SNOTEL sites [Saddle Mountain SNOTEL](#) and [Moose Creek SNOTEL](#), which received about 230% of their typical February snowfall. Mountain snow arrived consistently during the month and February ended with a storm that dropped nearly 3 inches of snow water at upper elevations. With just over a month left in the typical snow accumulation season, average snowfall in March would maintain a normal snowpack heading into the runoff season.

### ***Bitterroot River Basin Data Summary***

<b><i>Snowpack</i></b>	<b>Percent of 1981-2010 Normal (Median)</b>	<b>Last Year Percentage of Normal (Median)</b>
WEST FORK BITTERROOT	101%	137%
EAST SIDE BITTERROOT	103%	138%
WEST SIDE BITTERROOT	109%	131%
<b>Basin-Wide Snowpack</b>	<b>106%</b>	<b>133%</b>

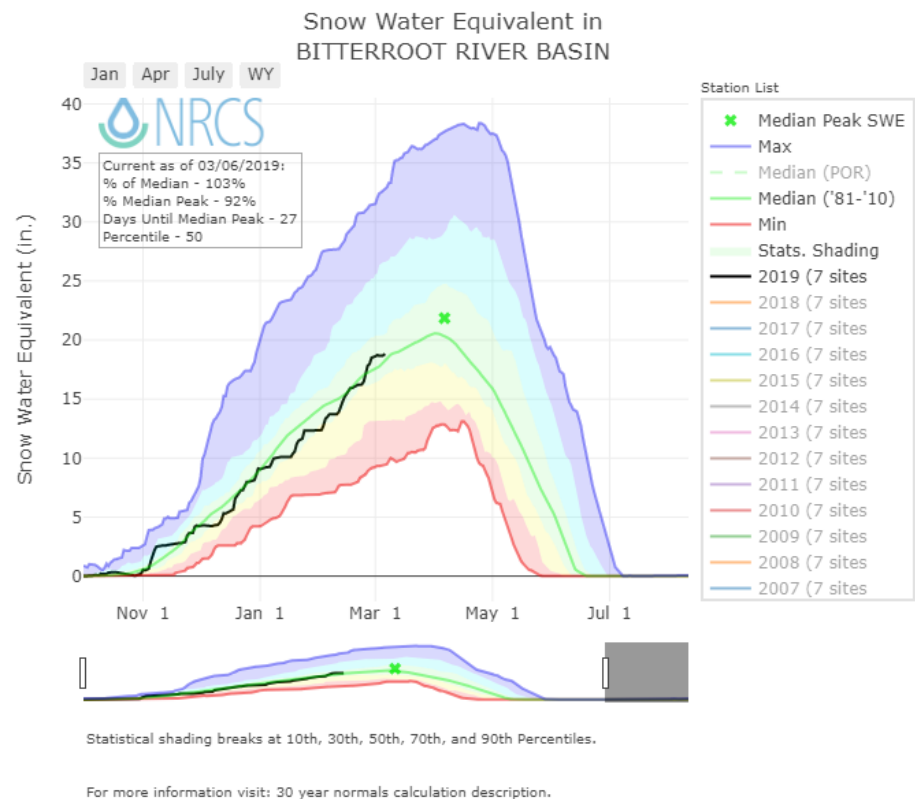
<b><i>Precipitation</i></b>	<b>Monthly Percentage of Average</b>	<b>WYTD Percentage of 1981-2010 Average*</b>	<b>WYTD Last Year Percentage of Average</b>
Mountain Precipitation	143%	103%	122%
Valley Precipitation	%	%	%
<b>Basin-Wide Precipitation</b>	<b>143%</b>	<b>103%</b>	<b>122%</b>

\*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

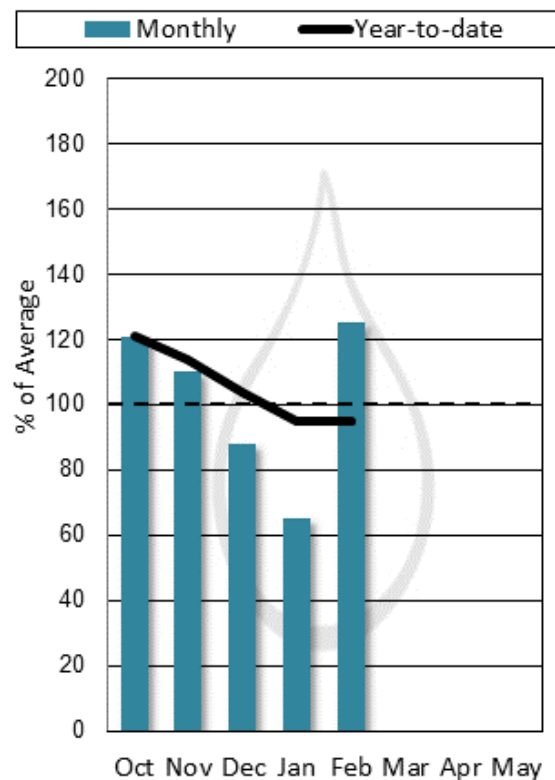
	<b>Percentage of Average</b>	<b>Percentage of Capacity (Total)</b>	<b>Last Year Percentage of Average</b>
<b>Basin-Wide Storage</b>	<b>118%</b>	<b>44%</b>	<b>186%</b>

\*See Reservoir Storage Table for storage in individual reservoirs

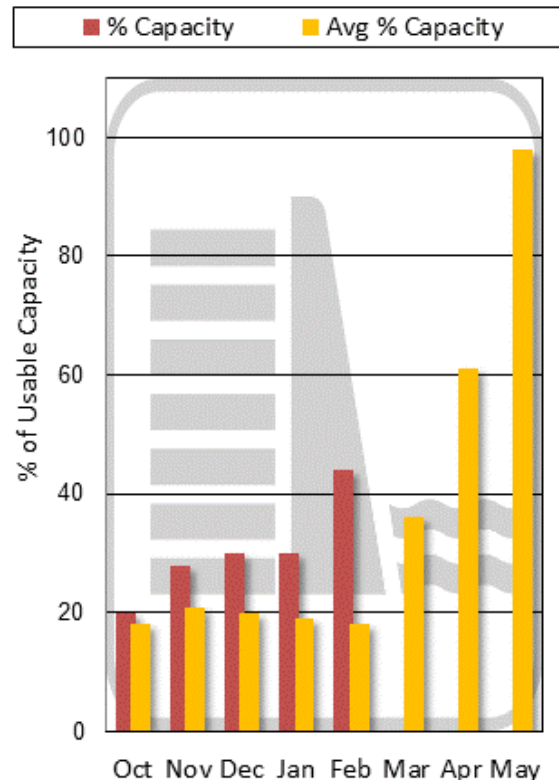
(click on chart below to navigate to [online version](#) with additional features)



### Mountain and Valley Precipitation



### End of Month Reservoir Storage



Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.



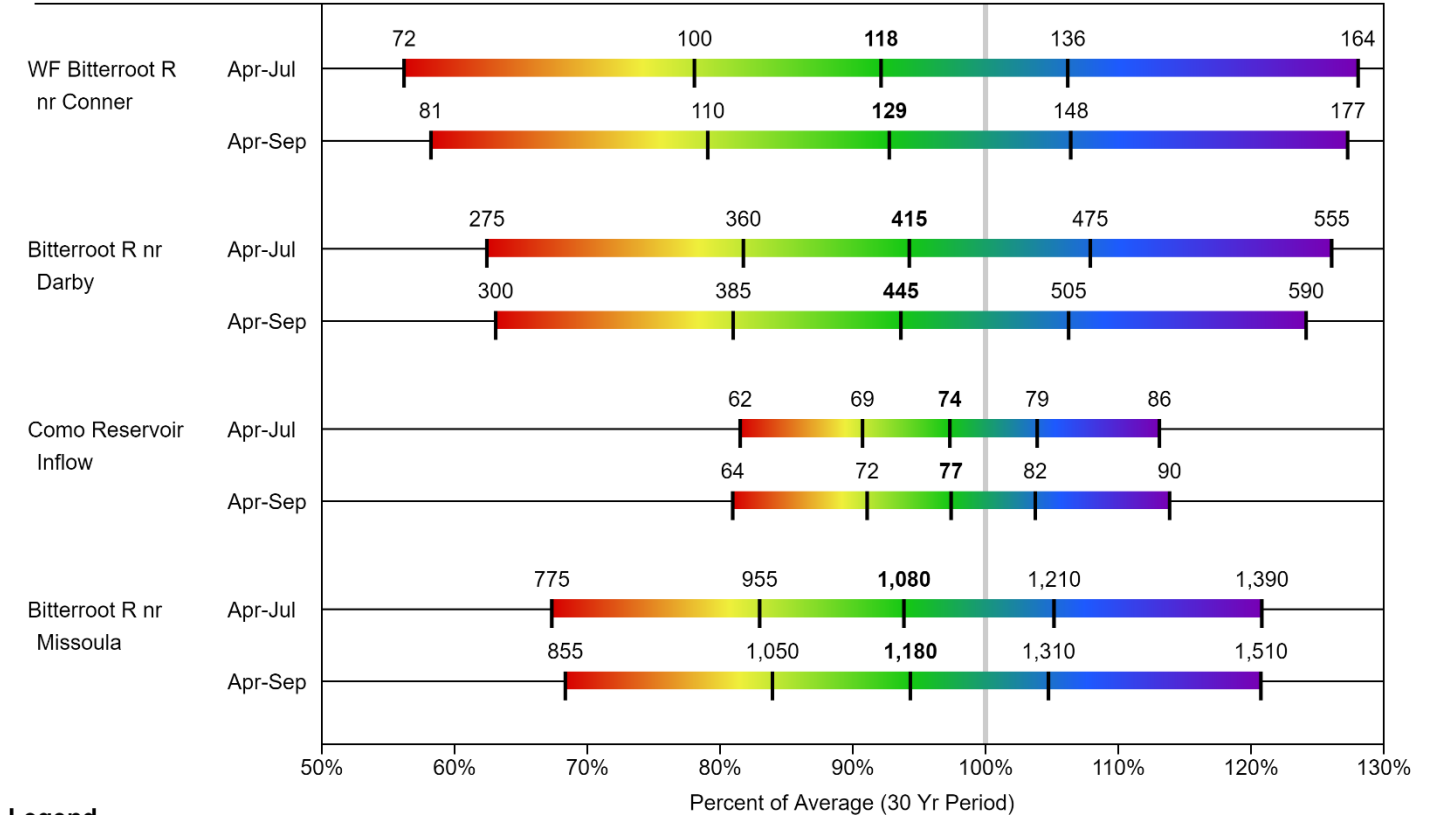
# BITTERROOT RIVER BASIN

## Water Supply Forecasts

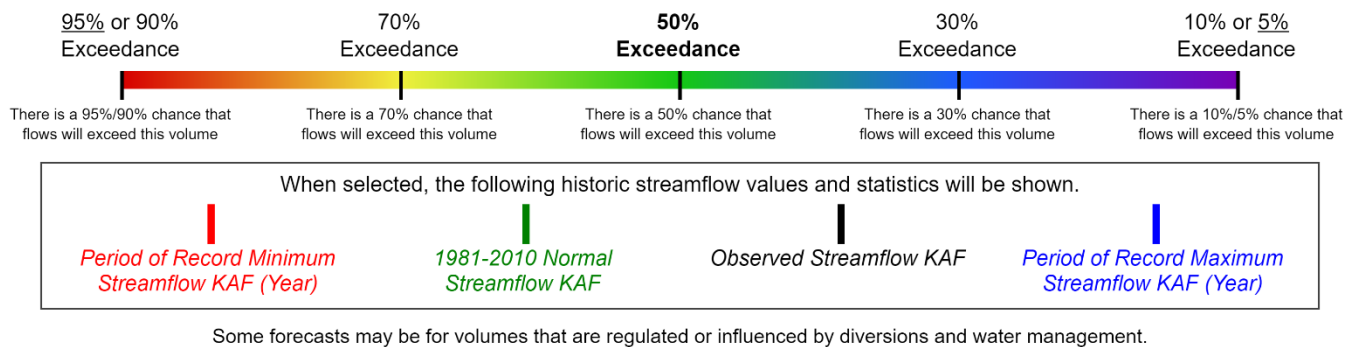
### March 1, 2019

#### Forecast Exceedance Probabilities

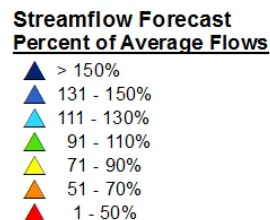
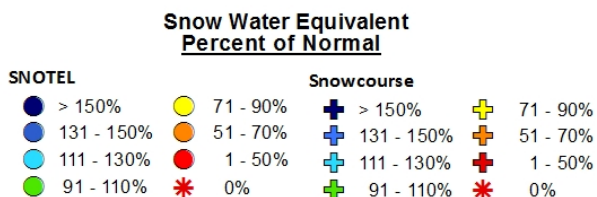
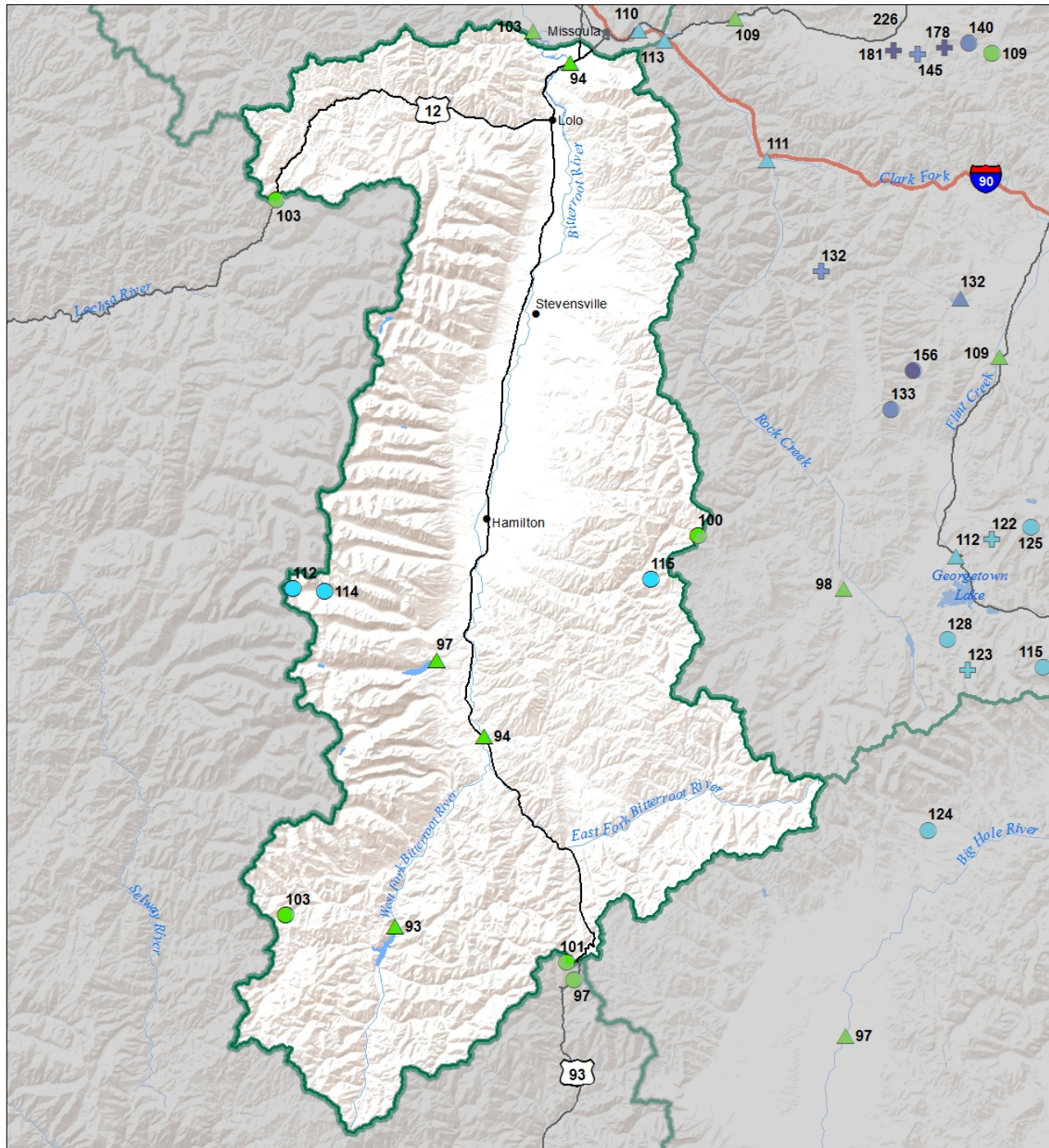
<----- Drier ----- Future Conditions ----- Wetter ----->  
Labels on chart represent volumes of water expressed in thousand acre-feet.



#### Legend

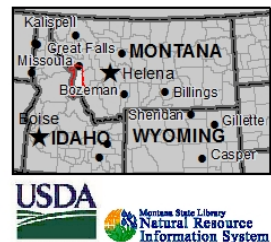
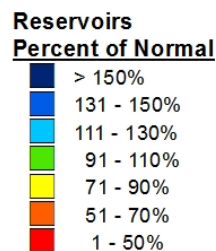
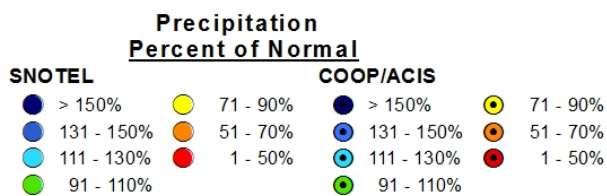
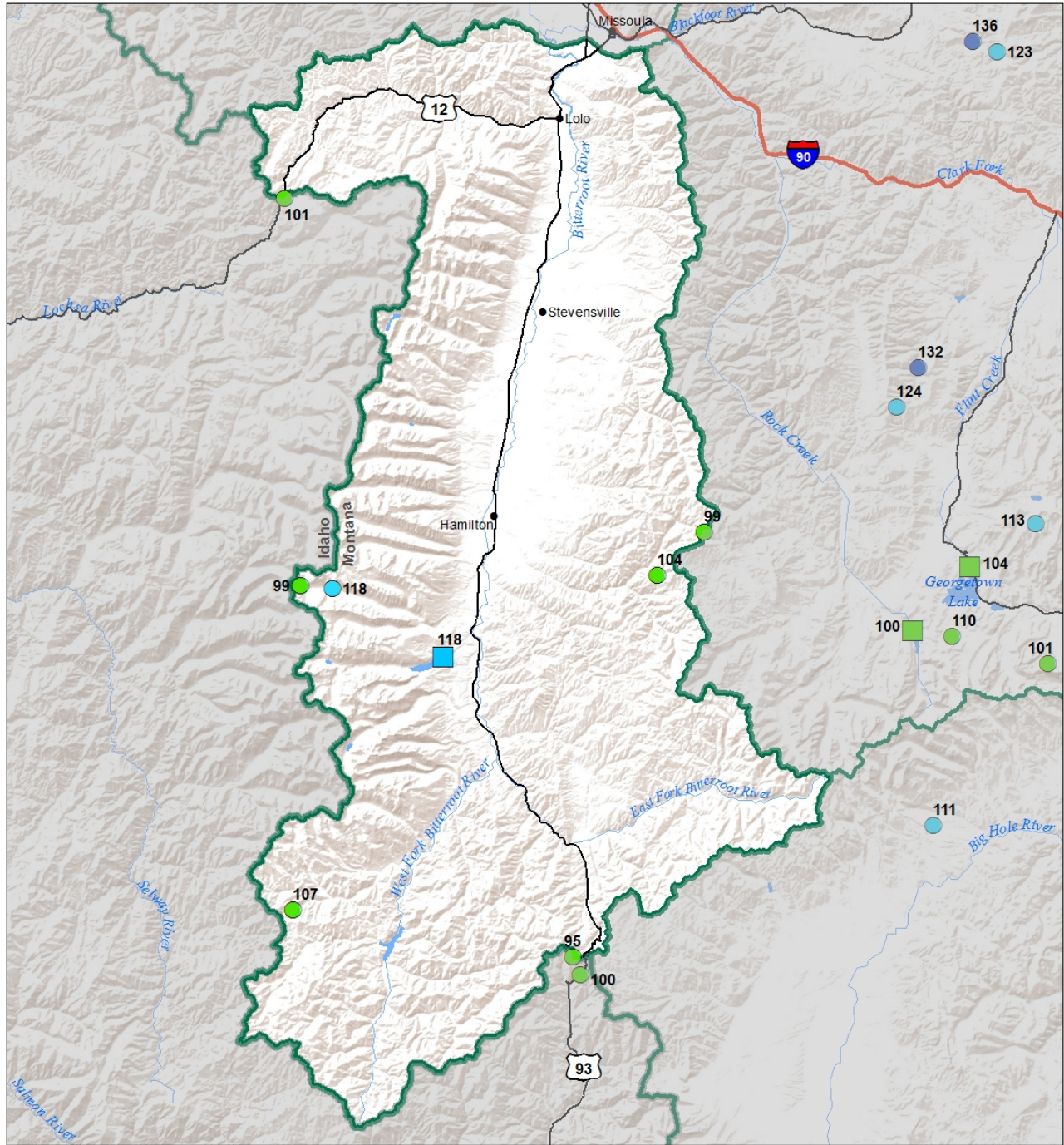


**Bitterroot River Basin**  
**Streamflow Forecast, Snow Water Equivalent**  
**Percentage of Normal**  
**March 1, 2019**



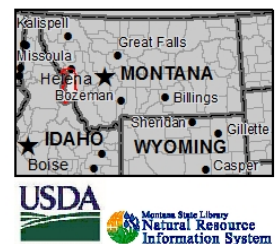
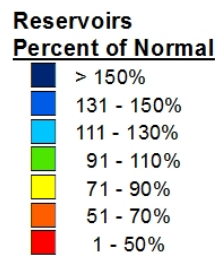
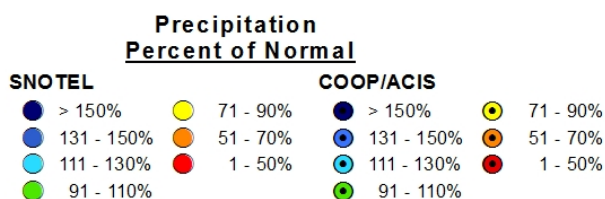
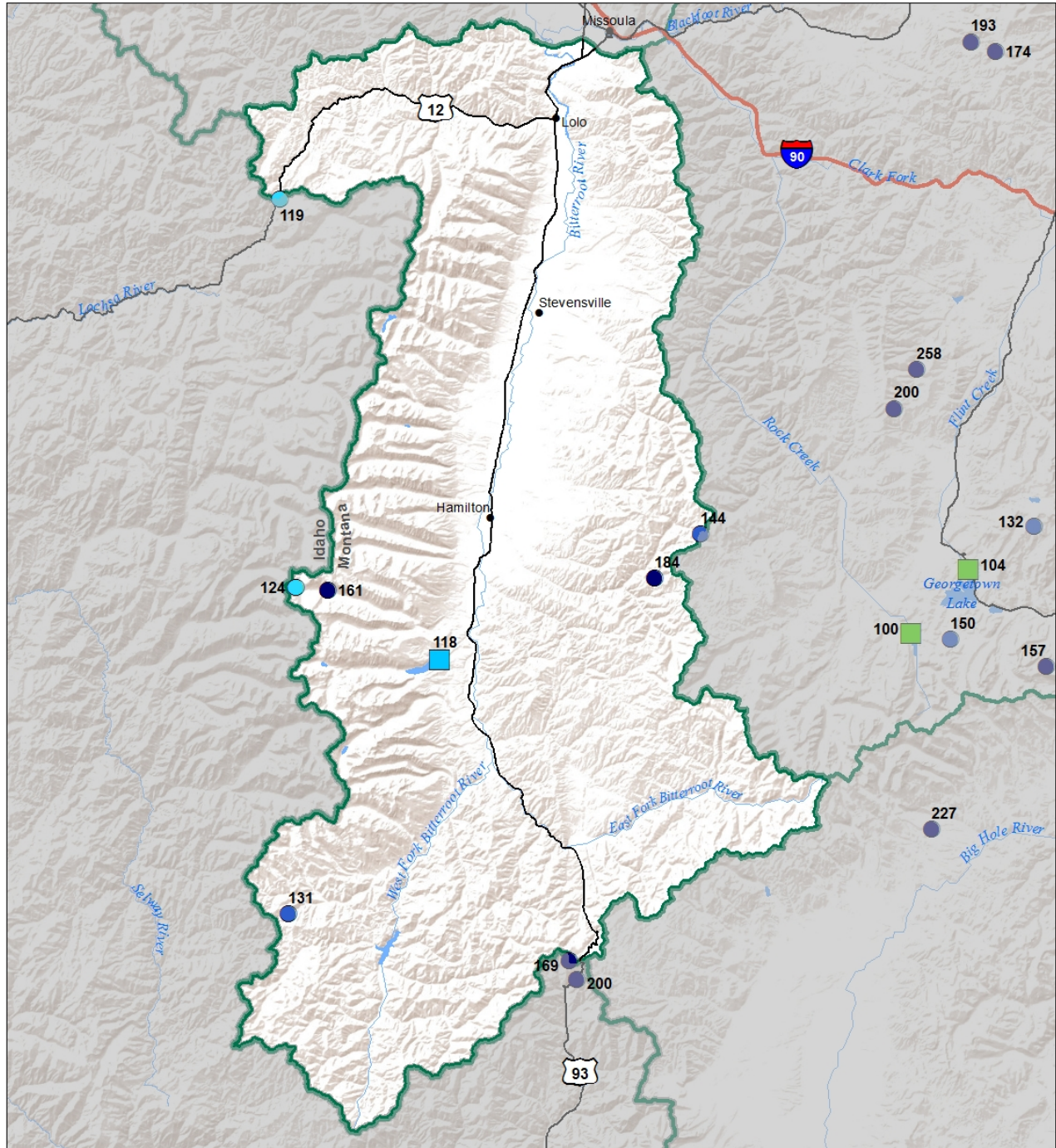


**Bitterroot River Basin**  
**Water Year to Date Precipitation and Reservoir Levels**  
**Percentage of Normal**  
**March 1, 2019**





**Bitterroot River Basin**  
**Monthly Precipitation and Reservoir Levels**  
**Percentage of Normal**  
**March 1, 2019 (February 1, 2019 - March 1, 2019)**





## Lower Clark Fork River Basin



February precipitation was well above average in the Lower Clark Fork River basin. This helped the basin recover from a relatively dry start to the water year. Last month began with a large storm system that slammed the area. During the first 2 weeks of February [Hoodoo Basin SNOTEL](#) received about 6 inches of snow water. There was so much snow from this storm that I-90 at Lookout Pass was closed for a second time this year. This time it was due to an avalanche that buried the road. One driver was buried in the avalanche but not critically injured. Snow trickled in during the second half of the month and the last week of the month brought cold temperatures. Overall, both the snowpack and water year-to-date precipitation are at near normal conditions.

### Lower Clark For River Basin Data Summary

<b><i>Snowpack</i></b>	<b>Percent of 1981-2010 Normal (Median)</b>	<b>Last Year Percentage of Normal (Median)</b>
LOWER CLARK FORK RIVER BASIN	101%	101%
<b>Basin-Wide</b>	<b>101%</b>	<b>123%</b>

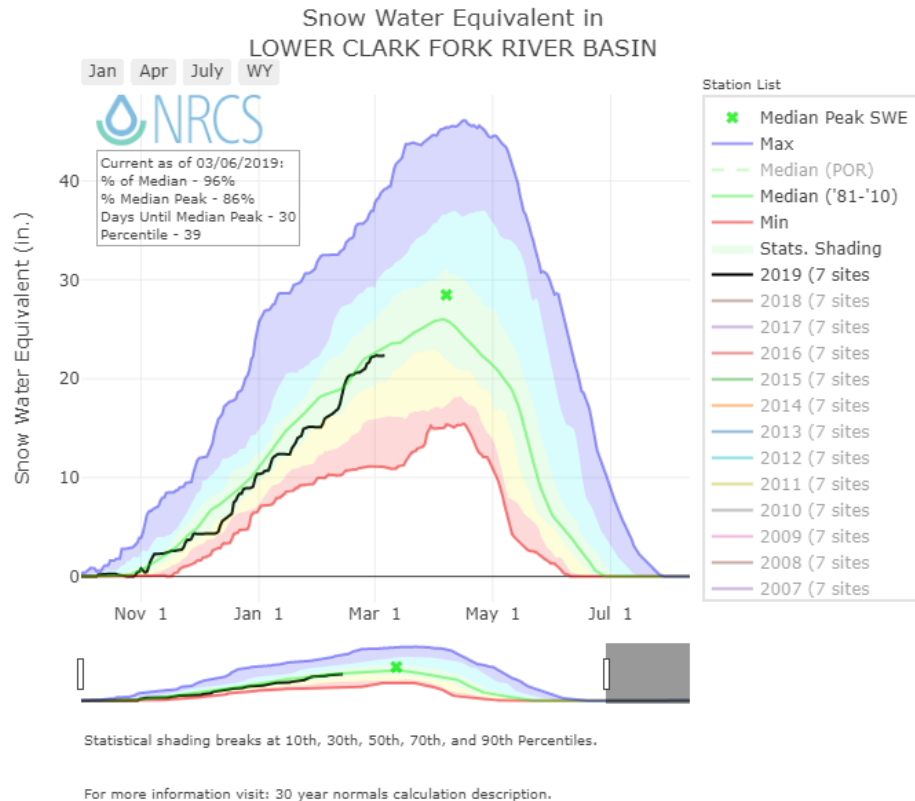
<b><i>Precipitation</i></b>	<b>Monthly Percentage of Average</b>	<b>WYTD Percentage of 1981-2010 Average*</b>	<b>WYTD Last Year Percentage of Average</b>
Mountain Precipitation	123%	93%	123%
Valley Precipitation	231%	164%	137%
<b>Basin-Wide Precipitation</b>	<b>125%</b>	<b>95%</b>	<b>123%</b>

\*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

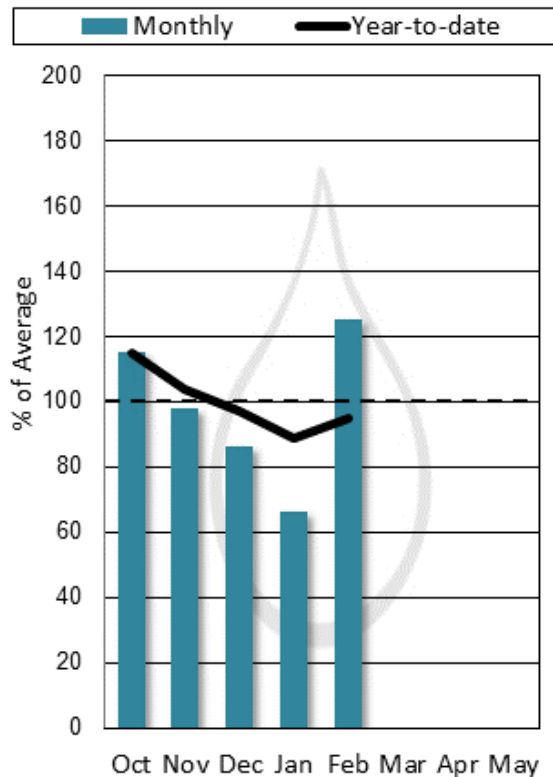
<b><i>Reservoir Storage</i></b>	<b>Percentage of Average</b>	<b>Percentage of Capacity (Total)</b>	<b>Last Year Percentage of Average</b>
<b>Basin-Wide Storage</b>	<b>97%</b>	<b>91%</b>	<b>101%</b>

\*See Reservoir Storage Table for storage in individual reservoirs

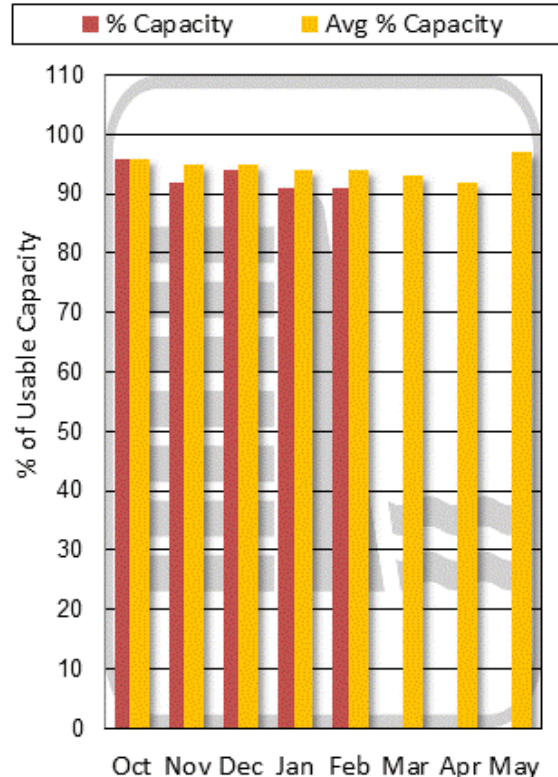
(click on chart below to navigate to [online version](#) with additional features)



### Mountain and Valley Precipitation



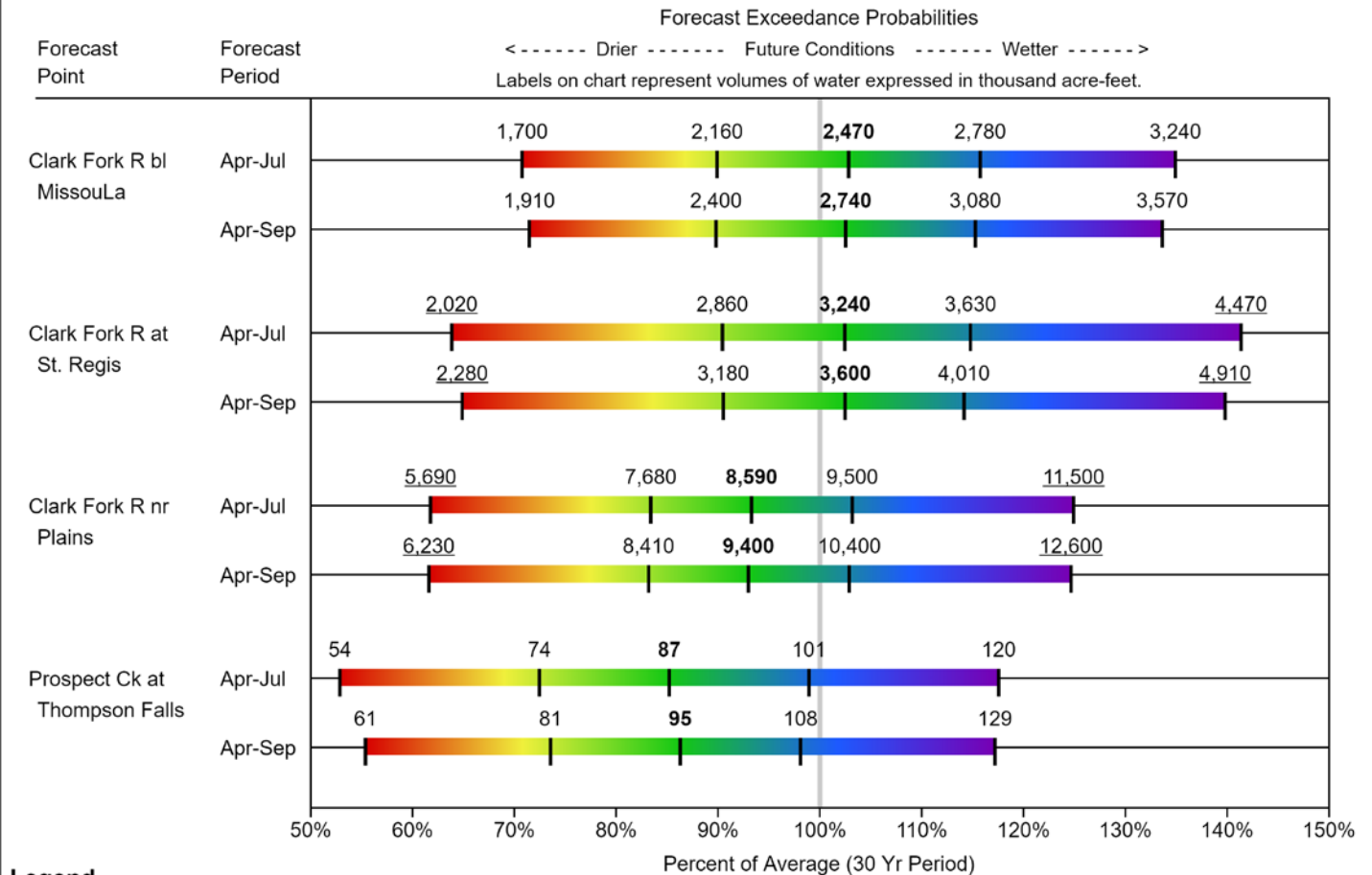
### End of Month Reservoir Storage



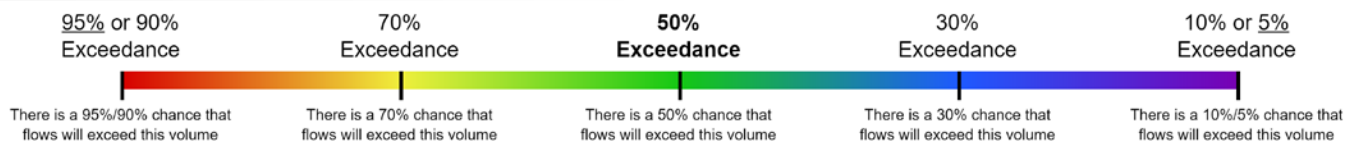
Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.



# LOWER CLARK FORK RIVER BASIN Water Supply Forecasts March 1, 2019



## Legend



When selected, the following historic streamflow values and statistics will be shown.

Period of Record Minimum  
Streamflow KAF (Year)

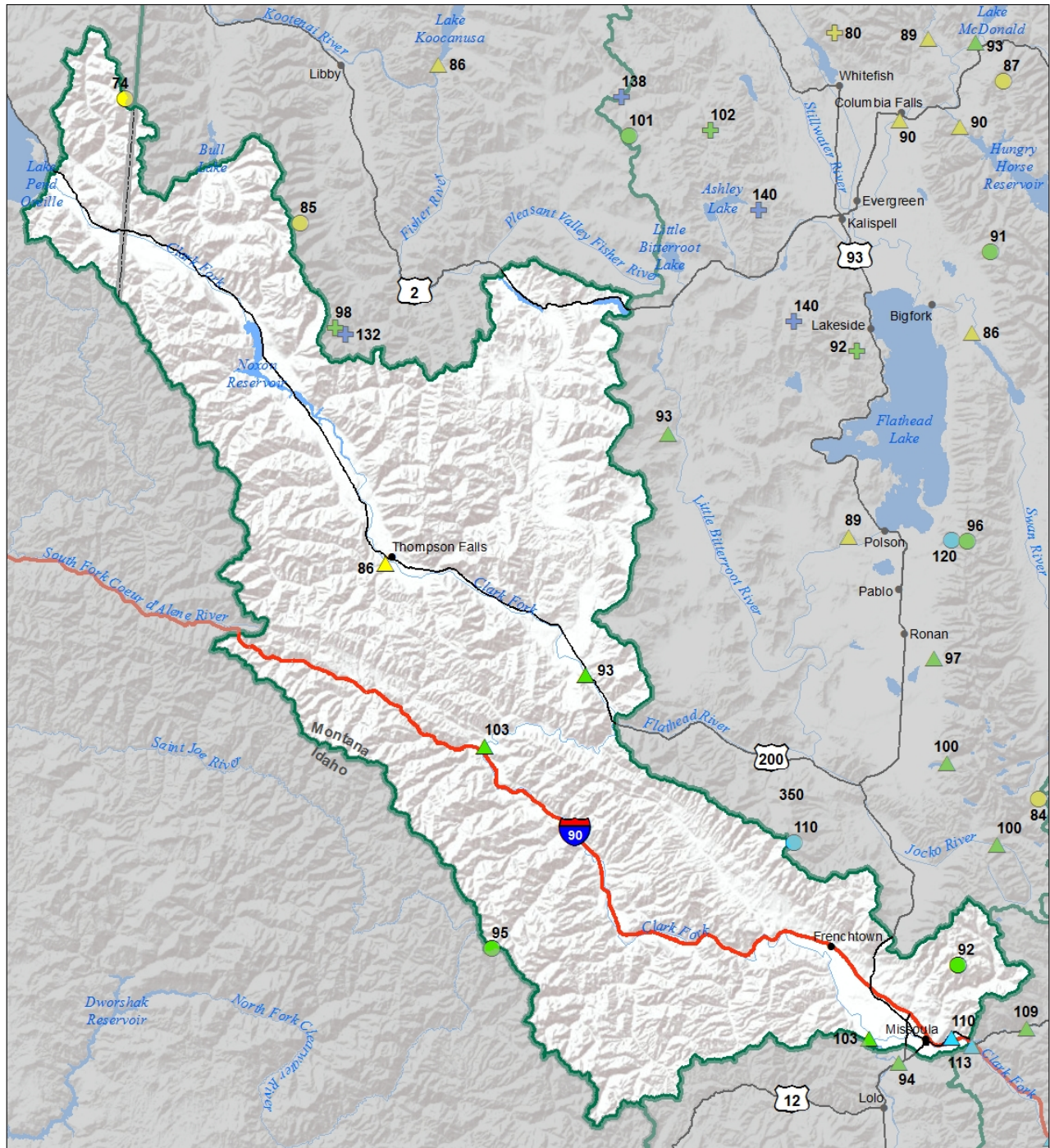
1981-2010 Normal  
Streamflow KAF

Observed Streamflow KAF

Period of Record Maximum  
Streamflow KAF (Year)

Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

**Lower Clark Fork River Basin  
Streamflow Forecast, Snow Water Equivalent  
Percentage of Normal  
March 1, 2019**



**Snow Water Equivalent  
Percent of Normal**

**SNOTEL**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%
- \*

**Snowcourse**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%
- \*

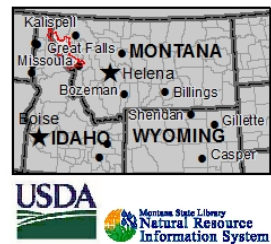
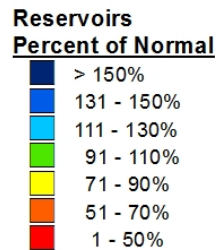
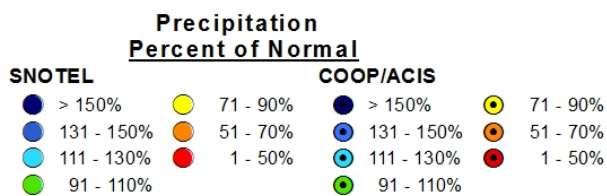
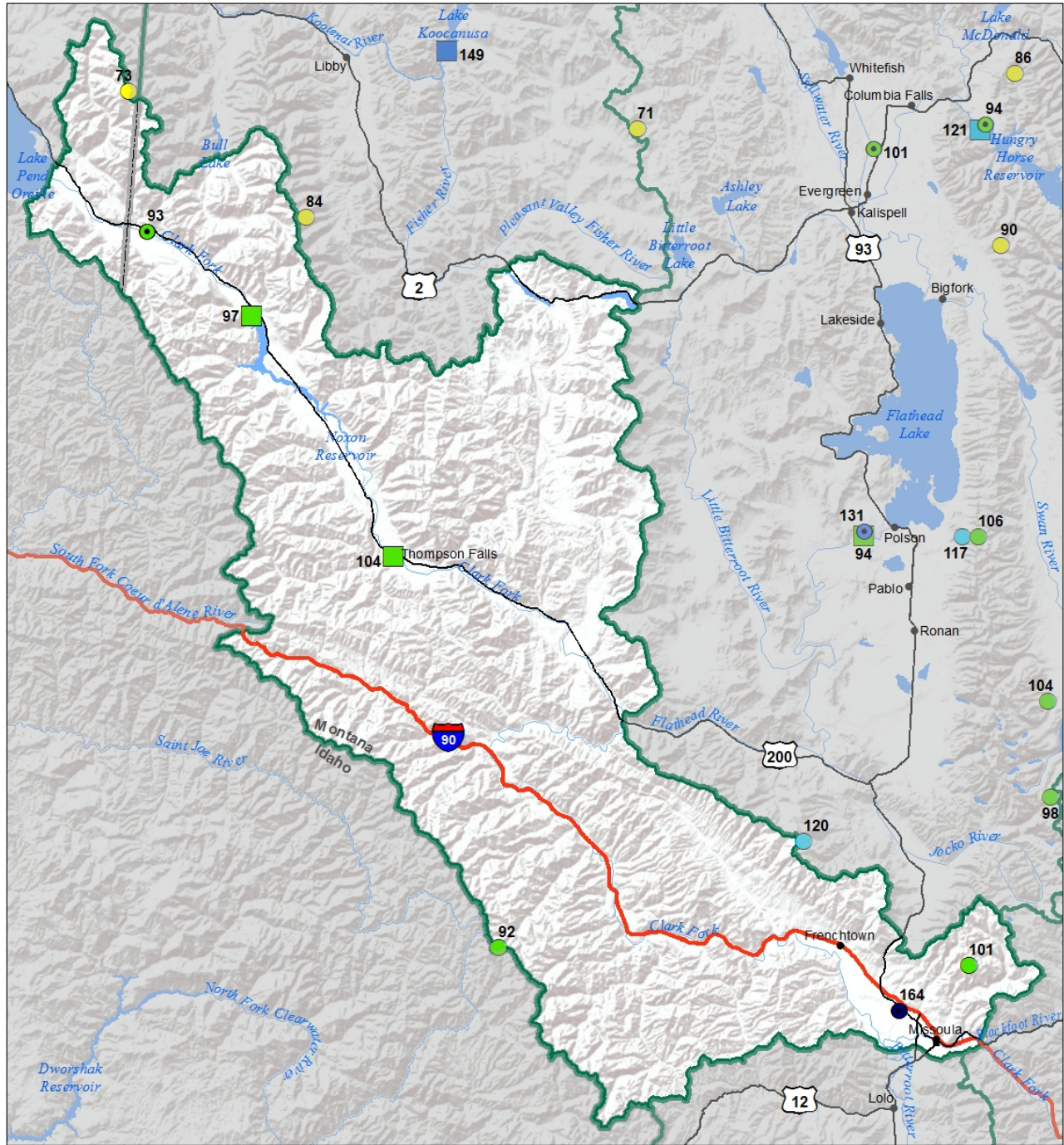
**Streamflow Forecast  
Percent of Average Flows**

- ▲ > 150%
- ▲ 131 - 150%
- ▲ 111 - 130%
- ▲ 91 - 110%
- ▲ 71 - 90%
- ▲ 51 - 70%
- ▲ 1 - 50%



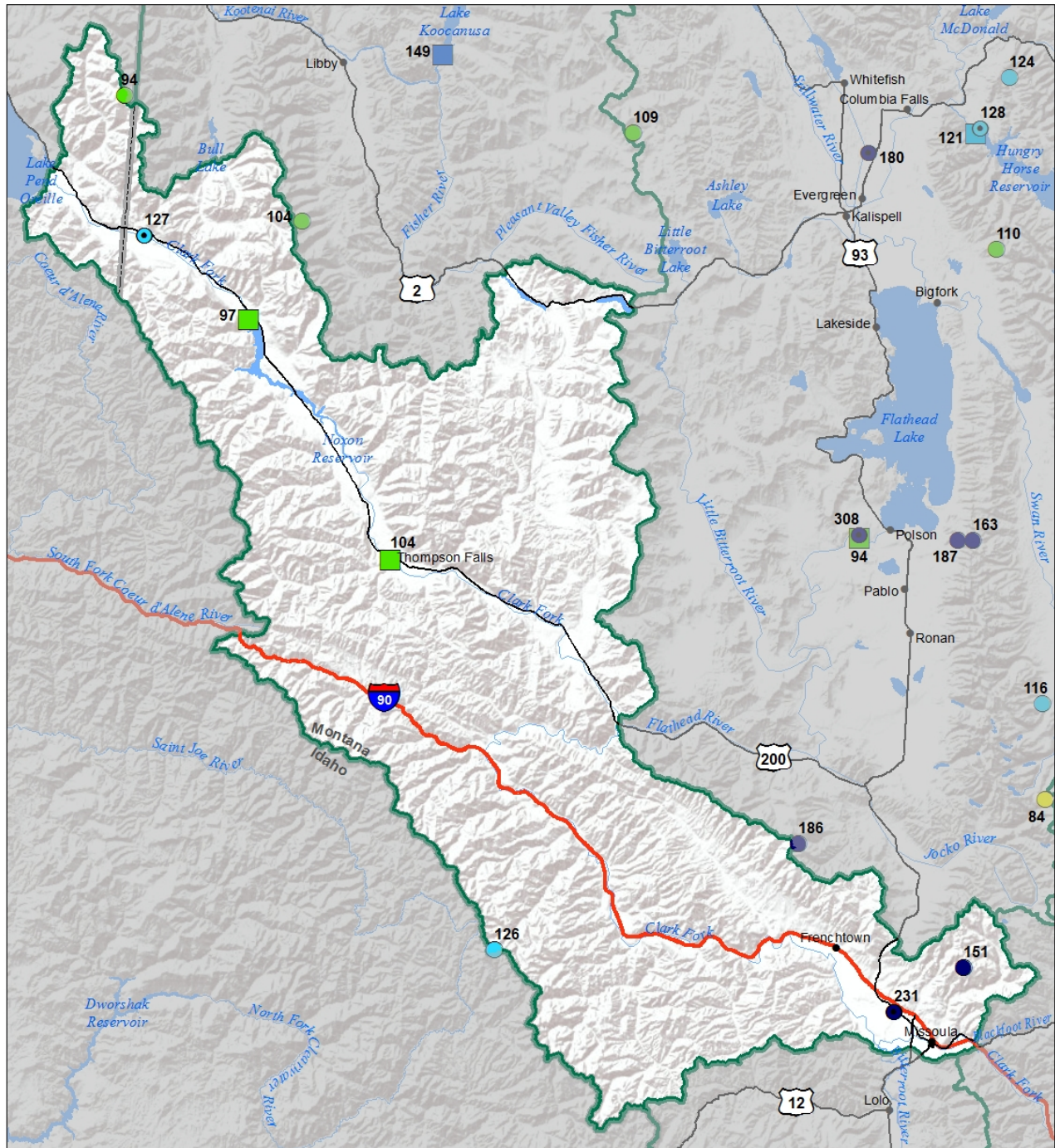


**Lower Clark Fork River Basin**  
**Water Year to Date Precipitation and Reservoir Levels**  
**Percentage of Normal**  
**March 1, 2019**

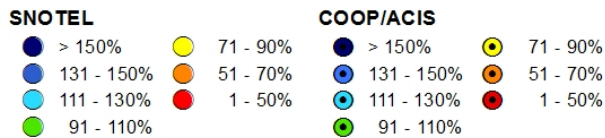




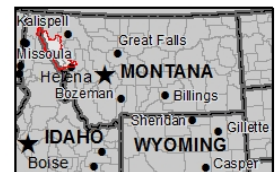
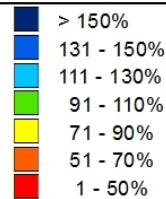
**Lower Clark Fork River Basin**  
**Monthly Precipitation and Reservoir Levels**  
**Percentage of Normal**  
**March 1, 2019 (February 1, 2019 - March 1, 2019)**



**Precipitation  
Percent of Normal**

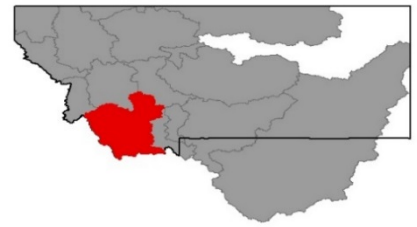


**Reservoirs  
Percent of Normal**





## Jefferson River Basin



The snowpack is getting deep in the headwaters of the Jefferson! While out collecting snow course data this month it was difficult to make it across flat fields, much less up into the mountains to sample select snow courses dating back to the early 1960's. What's there at low elevation is pretty much bottomless due to the cold temperatures "rotting" the snow during the prolonged cold snaps this winter. [Bloody Dick SNOTEL](#) recorded the lowest density mid-winter snowpack it ever has just last week at 19%, while much of the state is around the 27% mark. Even if the cold temps have created a weak snowpack, it all melts the same come spring time, and there's plenty of it. Snowfall was well [above normal](#) (>150%) to [record setting across the basin](#) during the month of February. SNOTEL sites in the Red Rock and Ruby River basins experienced their 1<sup>st</sup> or 2<sup>nd</sup> "snowiest" February on record, bringing some areas from well below normal on February 1<sup>st</sup> to near or above normal on March 1<sup>st</sup>. Not to be left out, the SNOTEL sites in the Tobacco Roots also experienced their 1<sup>st</sup> or 2<sup>nd</sup> snowiest February on record. While measurement locations in the Big Hole didn't set records for the month, the above normal snowfall was enough to improve snowpack to near or above normal at most locations. It was quite the turnaround in southwest MT, where the ideal snow producing weather pattern occurred throughout the month. Streamflow forecasts issued on March 1<sup>st</sup> for the April 1<sup>st</sup> – July 31<sup>st</sup> period across the basin range from near average to above average depending on the sub-basin. Please see the forecast chart below for individual forecasts. With reservoir levels at 127% for this date, and favorable early season streamflow forecasts, the story for spring and summer is looking much rosier than on February 1<sup>st</sup>. March through May typically make up about 25% of the typical seasons snowfall, so the story isn't over yet, but it's not a horror novel anymore.

### Jefferson River Basin Data Summary

<b>Snowpack</b>	<b>Percent of 1981-2010 Normal (Median)</b>	<b>Last Year Percentage of Normal (Median)</b>
BEAVERHEAD	114%	118%
RUBY	119%	125%
BIGHOLE	108%	142%
BOULDER	121%	174%
<b>Basin-Wide Snowpack</b>	<b>115%</b>	<b>137%</b>

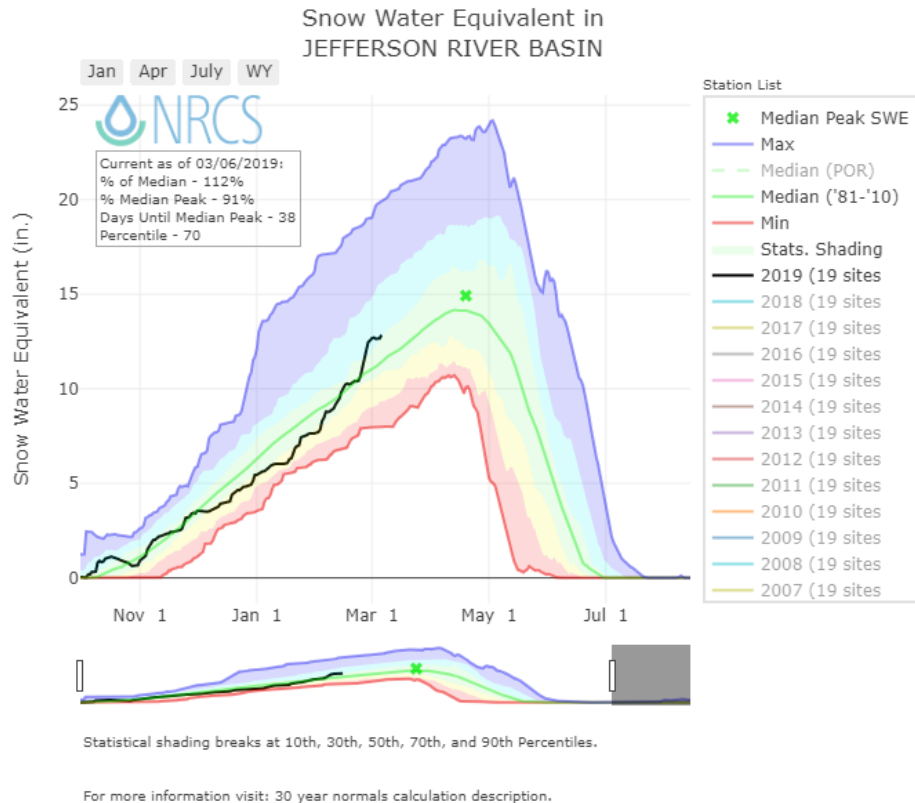
<b>Precipitation</b>	<b>Monthly Percentage of Average</b>	<b>WYTD Percentage of 1981-2010 Average*</b>	<b>WYTD Last Year Percentage of Average</b>
Mountain Precipitation	220%	114%	110%
Valley Precipitation	%	%	%
<b>Basin-Wide Precipitation</b>	<b>220%</b>	<b>114%</b>	<b>110%</b>

\*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

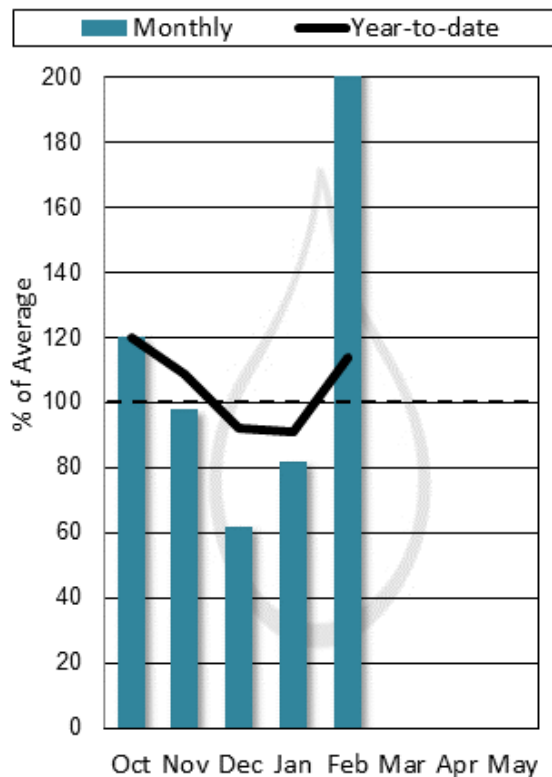
<b>Reservoir Storage</b>	<b>Percentage of Average</b>	<b>Percentage of Capacity (Total)</b>	<b>Last Year Percentage of Average</b>
<b>Basin-Wide Storage</b>	<b>127%</b>	<b>62%</b>	<b>129%</b>

\*See Reservoir Storage Table for storage in individual reservoirs

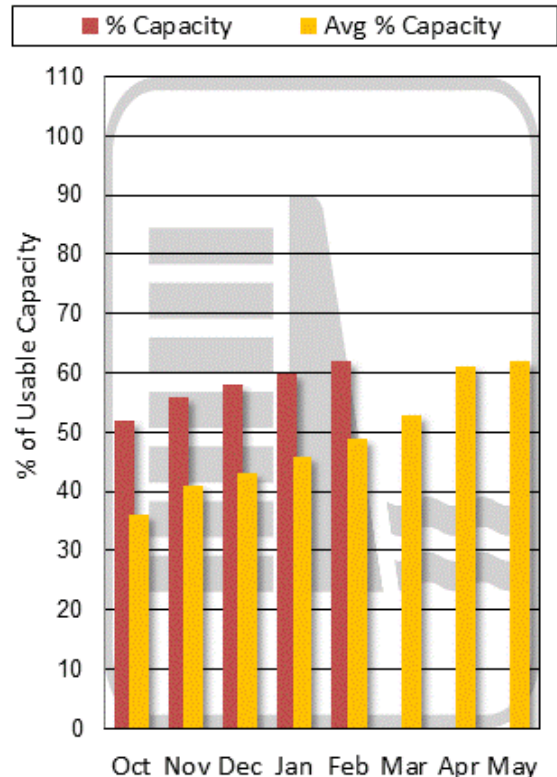
(click on chart below to navigate to [online version](#) with additional features)



### Mountain and Valley Precipitation



### End of Month Reservoir Storage



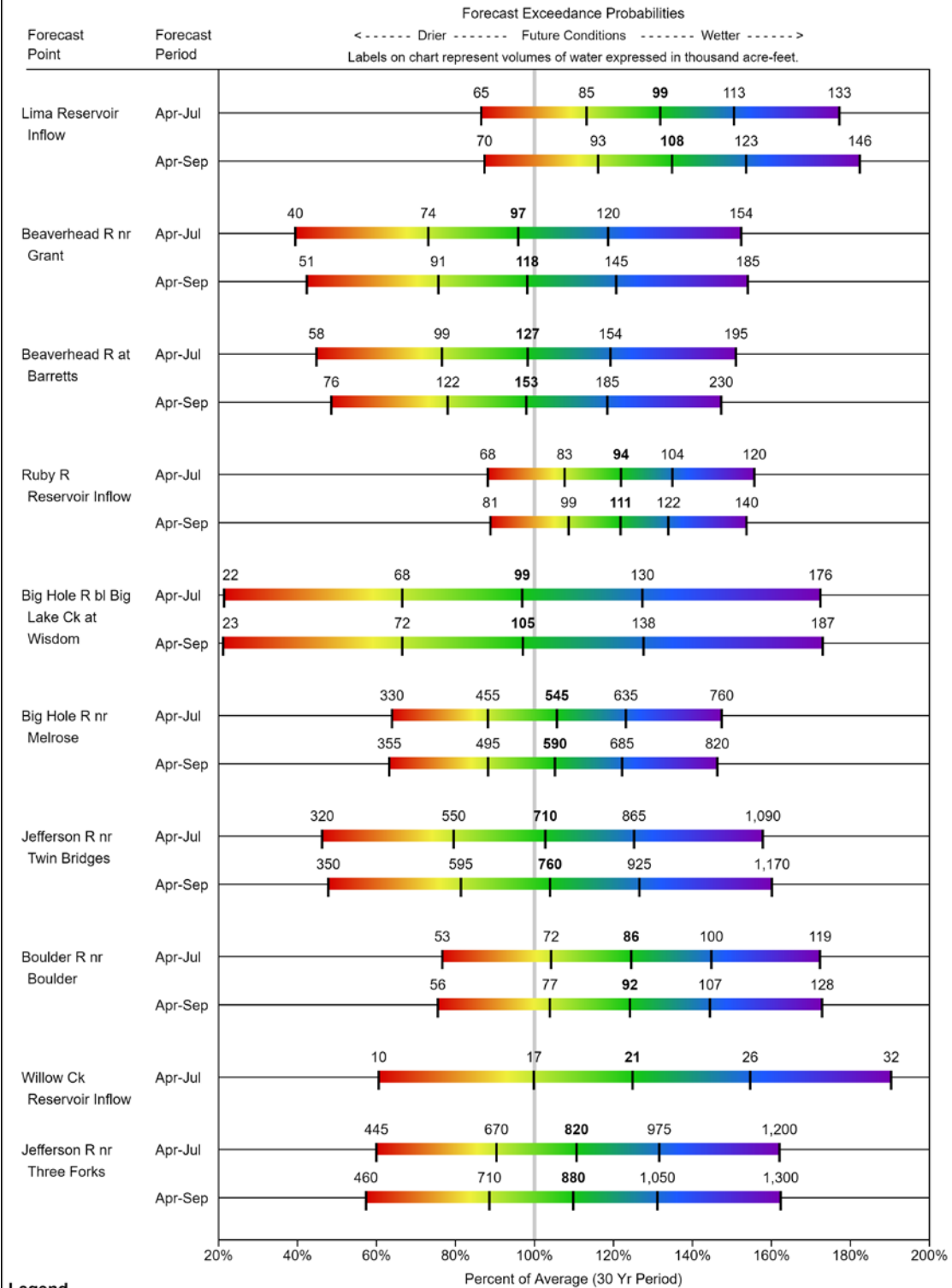
Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.



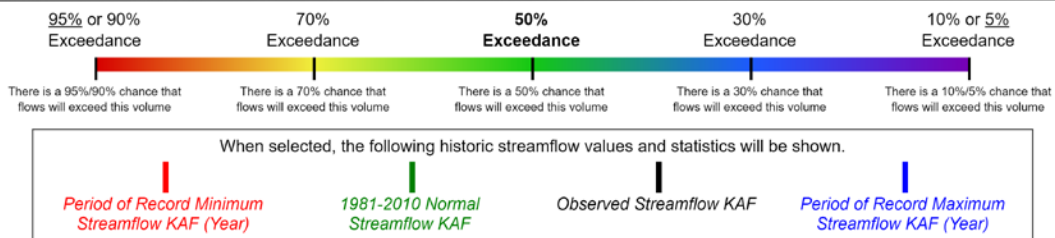
# JEFFERSON RIVER BASIN

## Water Supply Forecasts

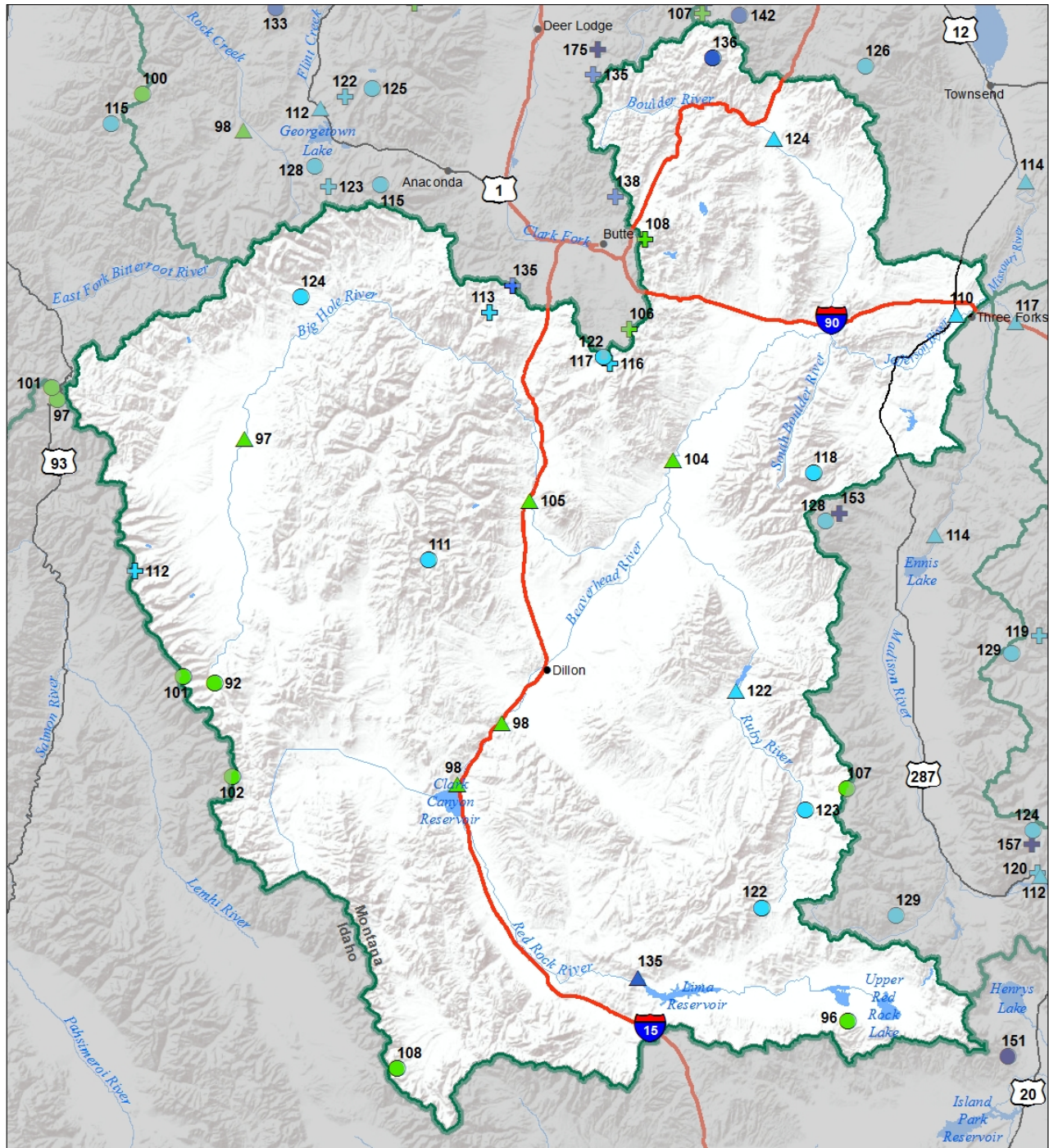
March 1, 2019



### Legend



**Jefferson River Basin  
Streamflow Forecast, Snow Water Equivalent  
Percentage of Normal  
March 1, 2019**

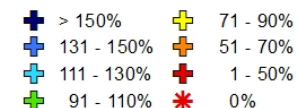


**Snow Water Equivalent  
Percent of Normal**

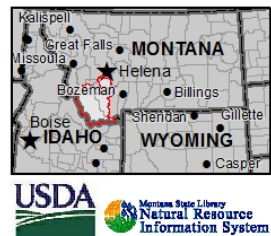
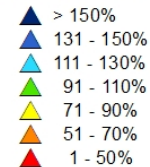
**SNOTEL**



**Snowcourse**

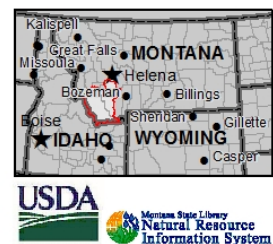
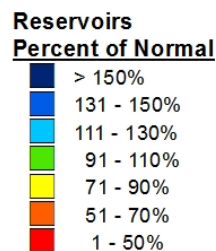
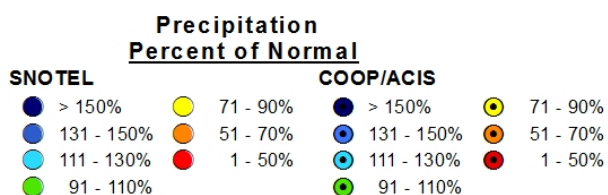
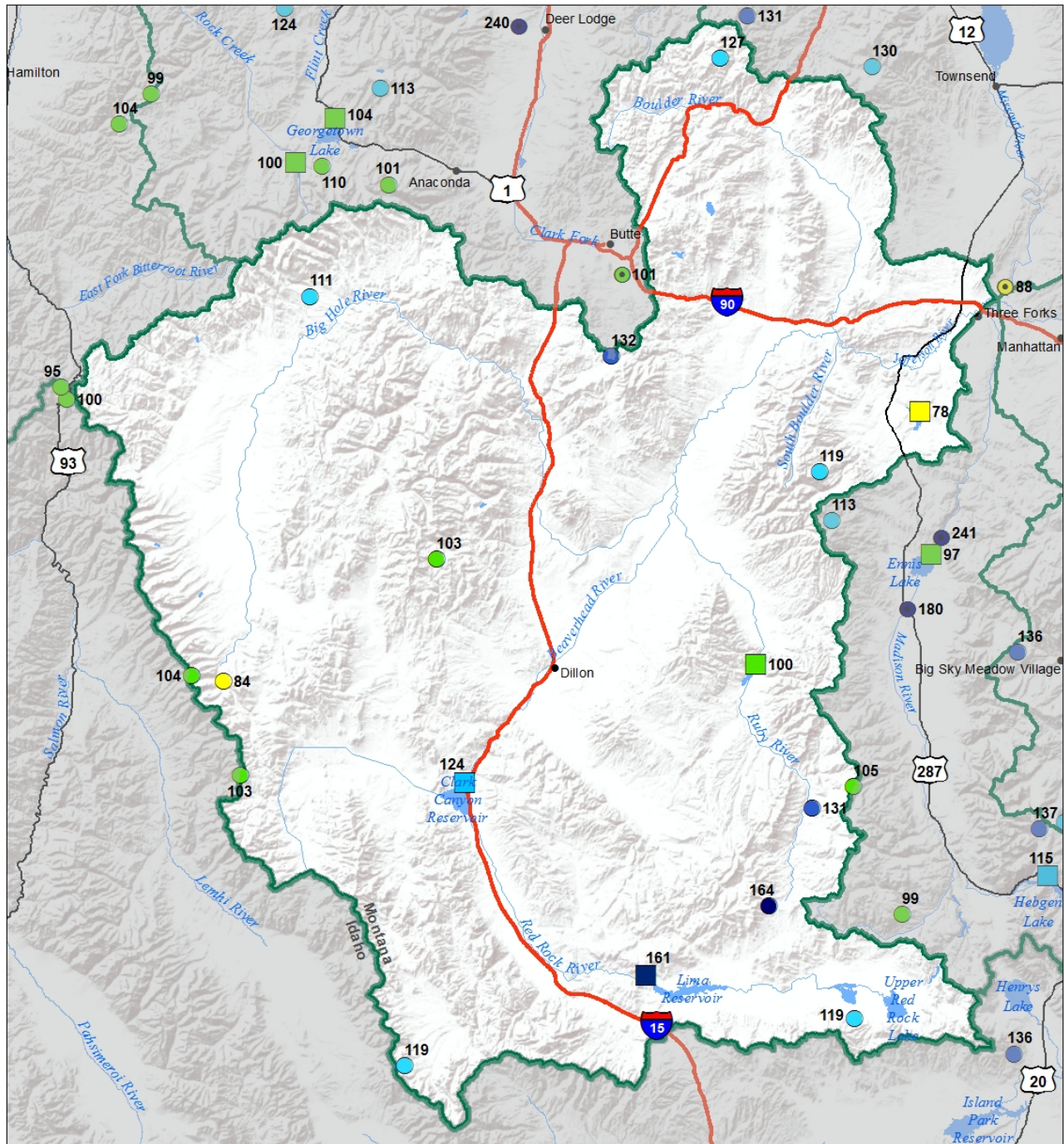


**Streamflow Forecast  
Percent of Average Flows**



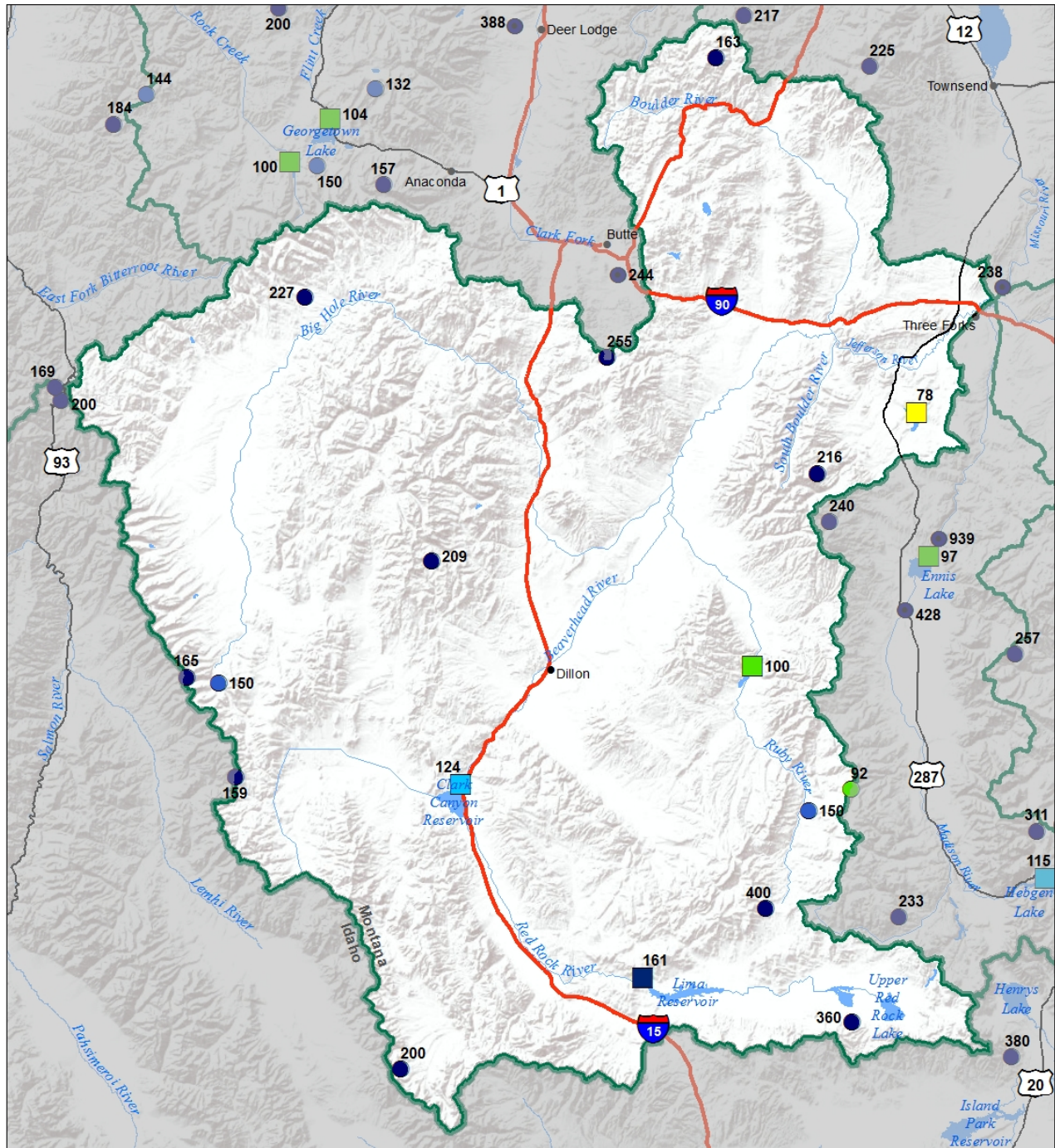


# Jefferson River Basin Water Year to Date Precipitation and Reservoir Levels Percentage of Normal March 1, 2019





**Jefferson River Basin**  
**Monthly Precipitation and Reservoir Levels**  
**Percentage of Normal**  
**March 1, 2019 (February 1, 2019 - March 1, 2019)**



**Precipitation  
Percent of Normal**

**SNOTEL**

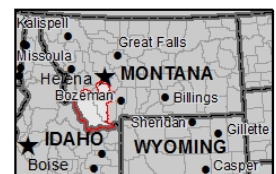
- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

**COOP/ACIS**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

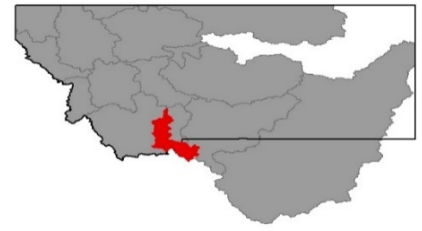
**Reservoirs  
Percent of Normal**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%





## Madison River Basin



What a whopper of a month February was for the Madison! The southwest storm track hammered the region with system after system, totaling almost 20" of SWE (65" of settled snow depth) at [Black Bear SNOTEL](#), an all-time record for the month of February. In fact, all sites on the Madison Plateau received the snowiest February on record, with most sites in the region dating back to 1967. The Madison has jumped from 85% of normal snowpack at the end of January to 130% of normal as of March 1<sup>st</sup>. All of the sites in Madison, Tobacco Root and Gravelly Mountains are above normal as all gained 1-2 feet of new snow (3-8" of SWE). With above average storage still in Hebgen Lake and near average in Ennis Lake, the Madison River is on track to have a plentiful runoff season for irrigators and fisherman alike. Streamflow forecasts issued on March 1<sup>st</sup> for the April 1<sup>st</sup> – July 31<sup>st</sup> period indicate we're likely to have above average streamflow volumes this summer. Although, we still have the snowiest months ahead of us as March thru May are climatologically favored to yield significant precipitation. So, for now, it's a waiting game to see how things shake out, but we sure are a lot better off than we were on February 1<sup>st</sup>.

### Madison River Basin Data Summary

<b>Snowpack</b>	<b>Percent of 1981-2010 Normal (Median)</b>	<b>Last Year Percentage of Normal (Median)</b>
MADISON abv HEBGEN LAKE	134%	124%
MADISON blw HEBGEN LAKE	127%	121%
<b>Basin-Wide Snowpack</b>	<b>130%</b>	<b>122%</b>

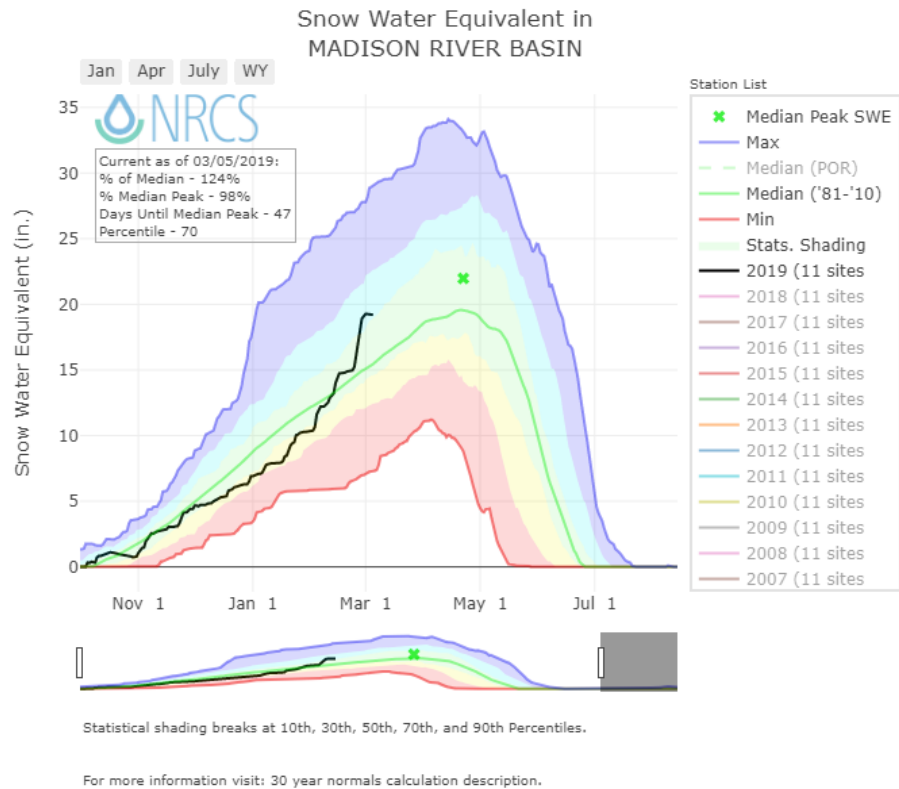
<b>Precipitation</b>	<b>Monthly Percentage of Average</b>	<b>WYTD Percentage of 1981-2010 Average*</b>	<b>WYTD Last Year Percentage of Average</b>
Mountain Precipitation	279%	119%	109%
Valley Precipitation	441%	152%	147%
<b>Basin-Wide Precipitation</b>	<b>292%</b>	<b>122%</b>	<b>112%</b>

\*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

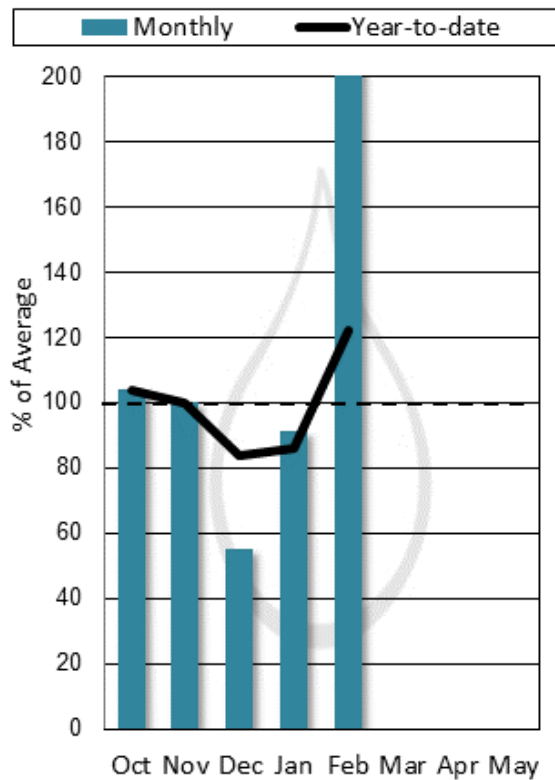
<b>Reservoir Storage</b>	<b>Percentage of Average</b>	<b>Percentage of Capacity (Total)</b>	<b>Last Year Percentage of Average</b>
<b>Basin-Wide Storage</b>	<b>113%</b>	<b>82%</b>	<b>111%</b>

\*See Reservoir Storage Table for storage in individual reservoirs

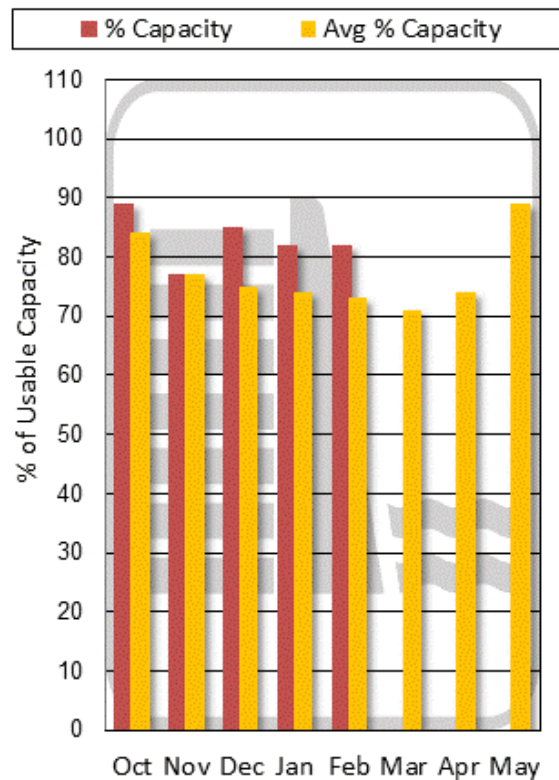
(click on chart below to navigate to [online version](#) with additional features)



### Mountain and Valley Precipitation



### End of Month Reservoir Storage



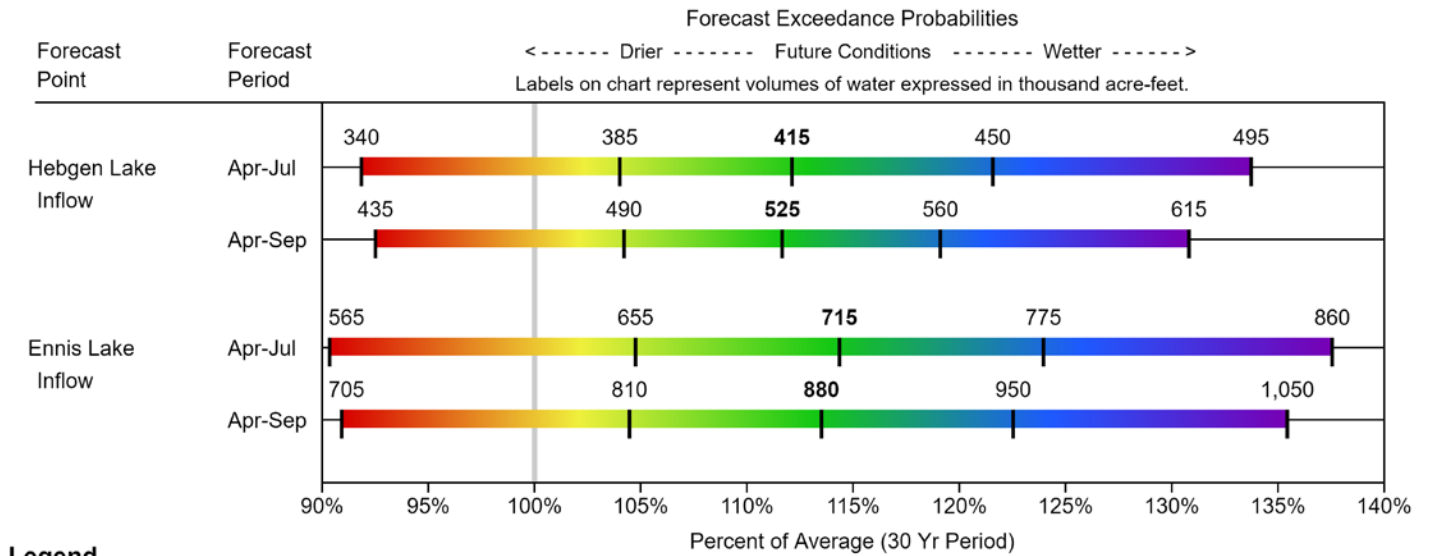
Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.



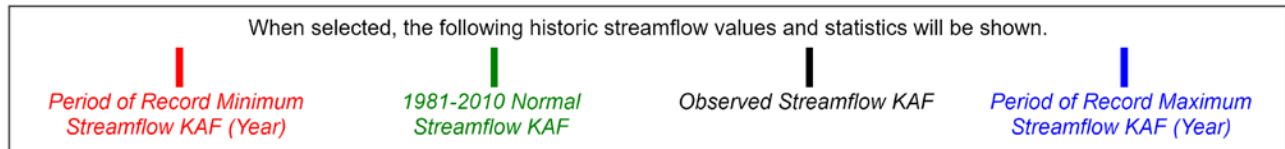
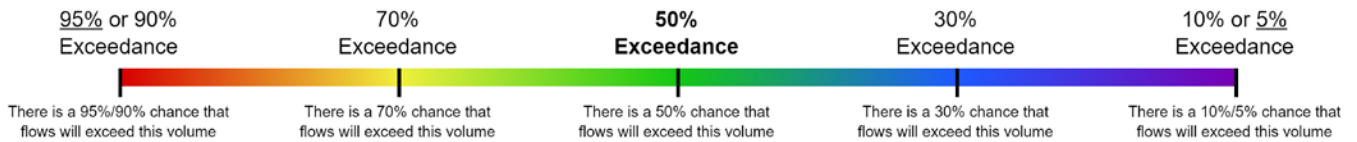
# MADISON RIVER BASIN

## Water Supply Forecasts

### March 1, 2019

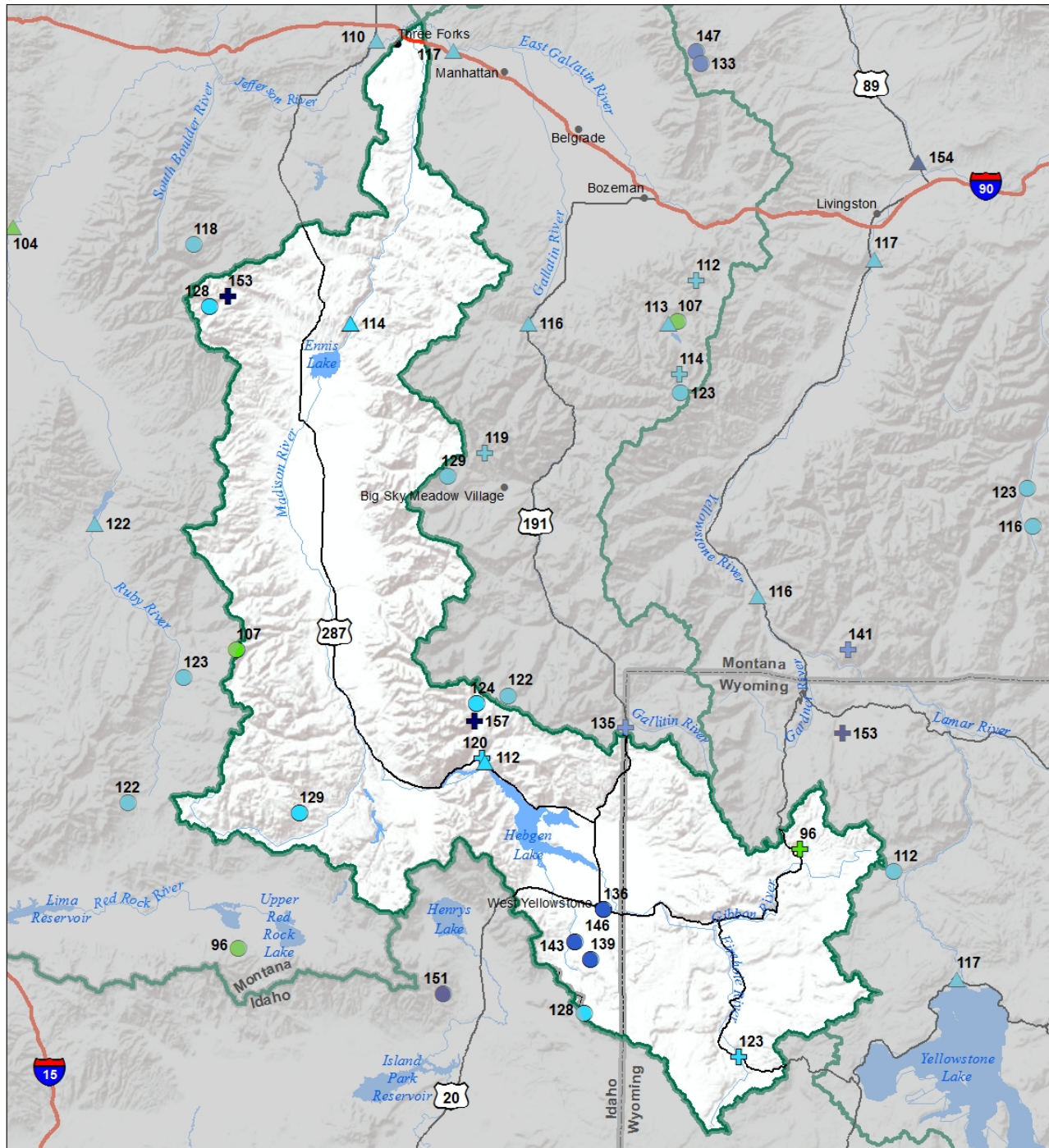


## Legend



Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

# Madison River Basin Streamflow Forecast, Snow Water Equivalent Percentage of Normal March 1, 2019



## **Snow Water Equivalent Percent of Normal**

### **SNOTEL**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

- 71 - 90%
- 51 - 70%
- 1 - 50%
- 0%

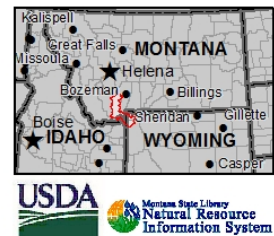
### **Snowcourse**

- ✚ > 150%
- ✚ 131 - 150%
- ✚ 111 - 130%
- ✚ 91 - 110%

- ✚ 71 - 90%
- ✚ 51 - 70%
- ✚ 1 - 50%
- ✚ 0%

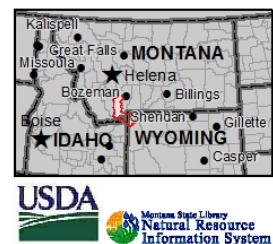
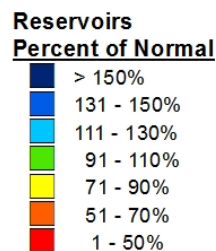
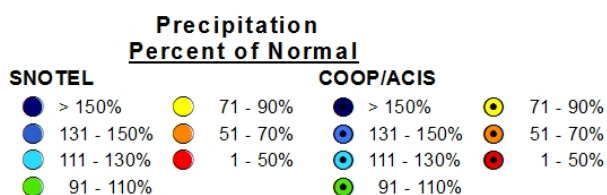
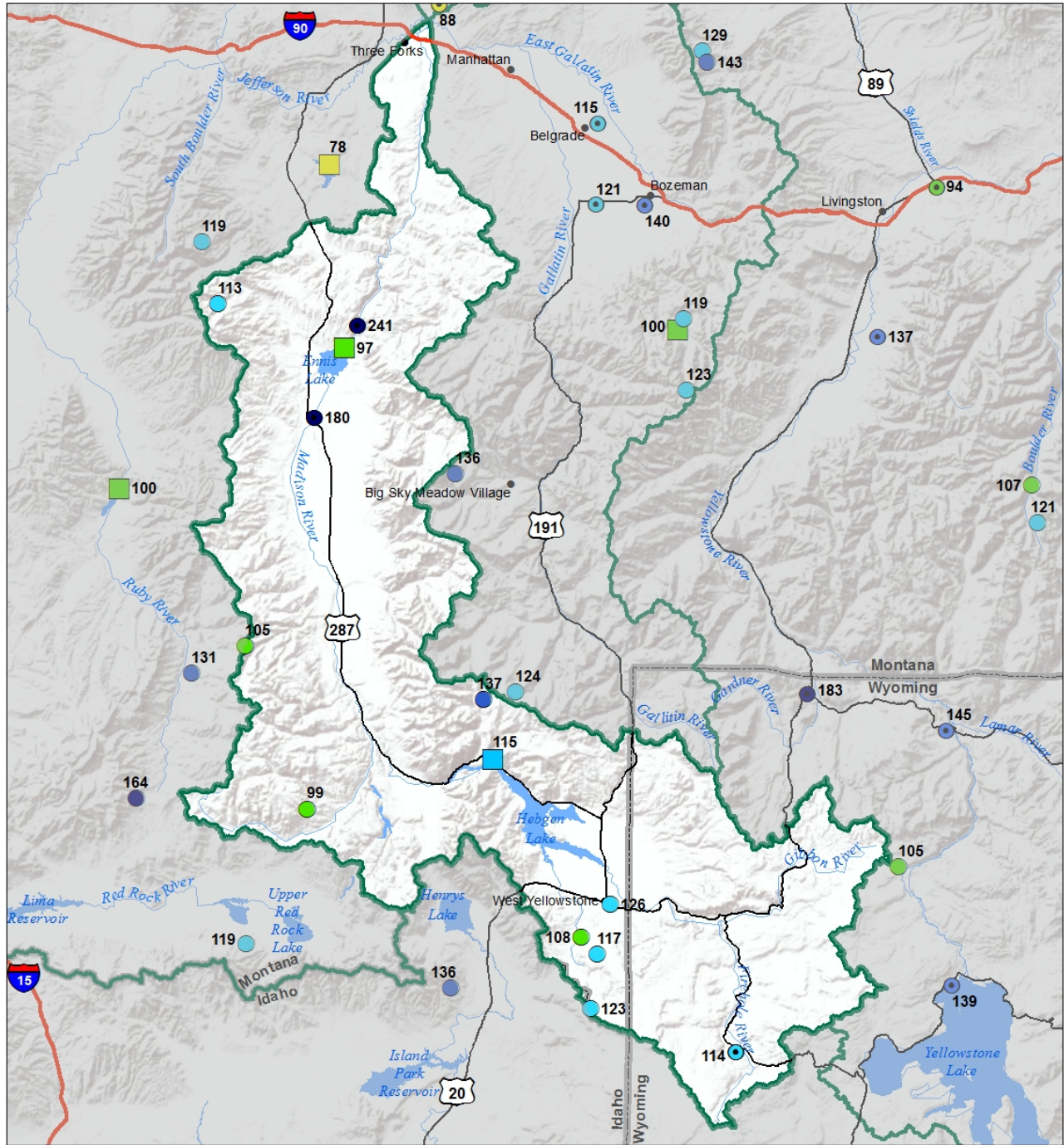
## **Streamflow Forecast Percent of Average Flows**

- ▲ > 150%
- ▲ 131 - 150%
- ▲ 111 - 130%
- ▲ 91 - 110%
- ▲ 71 - 90%
- ▲ 51 - 70%
- ▲ 1 - 50%



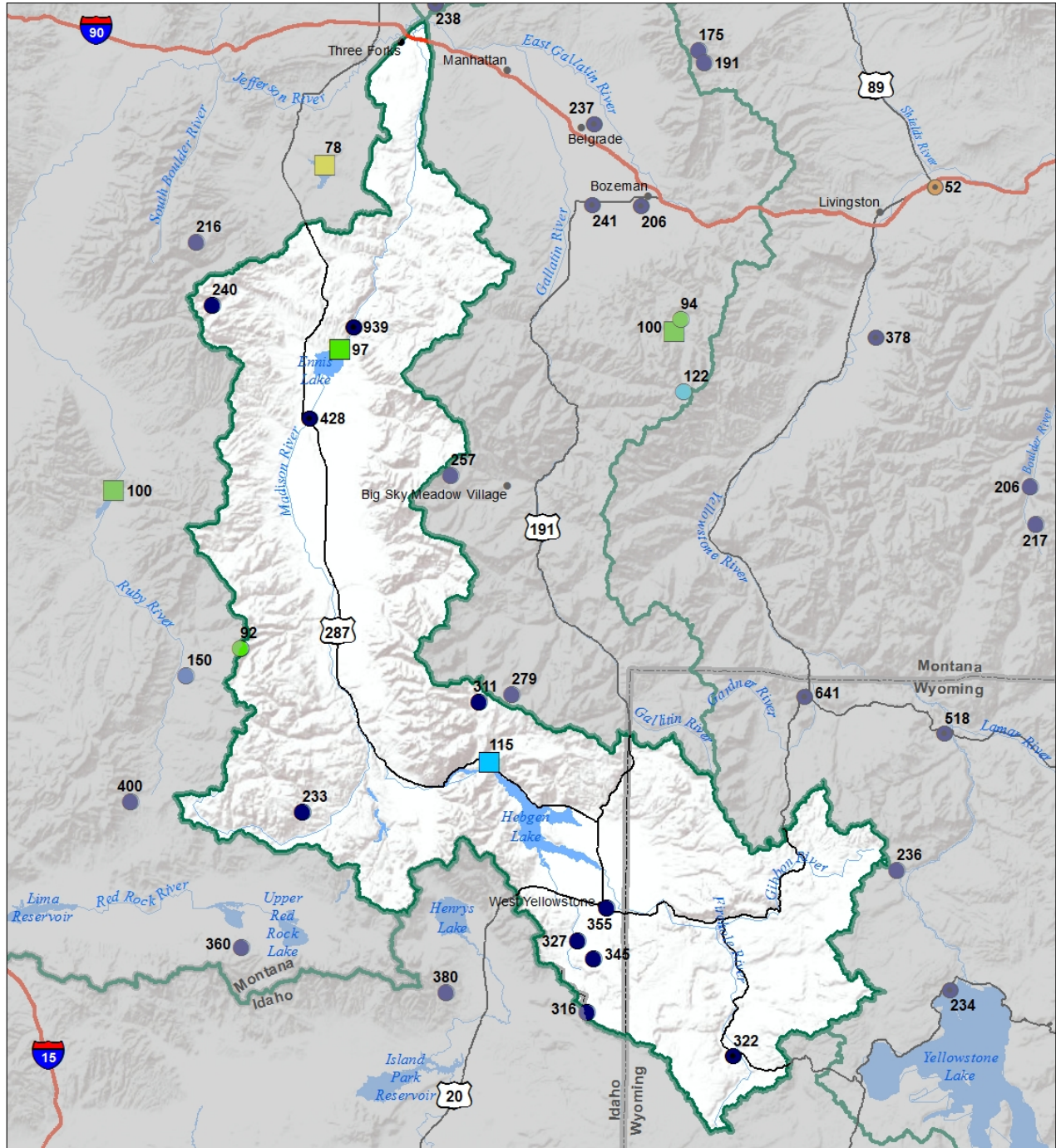


# Madison River Basin Water Year to Date Precipitation and Reservoir Levels Percentage of Normal March 1, 2019





**Madison River Basin**  
**Monthly Precipitation and Reservoir Levels**  
**Percentage of Normal**  
**March 1, 2019 (February 1, 2019 - March 1, 2019)**



**Precipitation  
Percent of Normal**

**SNOTEL**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

**COOP/ACIS**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

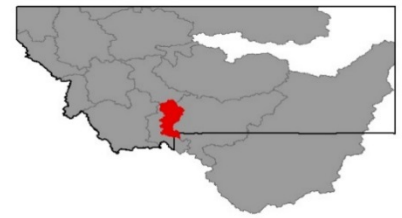
**Reservoirs  
Percent of Normal**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%





## Gallatin River Basin



The Gallatin River basin has been rock-steady this year, hovering right around the 100% of normal mark all winter for the overall basin, until mid-February when the sky opened up and decided to remind us what winter in Montana is all about. The Bridger Range received several storms to the delight of skiers and snowmobilers but the most impressive totals were found up the canyon towards the headwaters.

Throughout the winter, the headwaters of the Gallatin River have been just below normal until two big systems blanketed the region this month. [Carrot Basin SNOTEL](#) gained an inch of SWE per day over the last week of February, pushing totals from 83% of normal on February 1<sup>st</sup> to 122% of normal on March 1<sup>st</sup>, which is just downright impressive. Typically, at this point in the year around 75% of the peak snowpack has accumulated, with March and April providing the remaining 25%. With these typically “wet” months of March – May still to come there is still some uncertainty about where we’ll be when the snowpack reaches peak accumulation with regards to percentage of normal, but for now it’s looking like there should be adequate water supply to irrigate with and play in should the weather patterns we’ve been experiencing so far this winter persist. Streamflow forecasts issued on March 1<sup>st</sup> for the April 1<sup>st</sup> – July 31<sup>st</sup> period indicate we’re likely to have above average streamflow volumes this summer, however the next two months are make or break with regards to water supply.

### Gallatin River Basin Data Summary

<b>Snowpack</b>	<b>Percent of 1981-2010 Normal (Median)</b>	<b>Last Year Percentage of Normal (Median)</b>
UPPER GALLATIN	121%	131%
HYALITE	116%	130%
BRIDGER	140%	162%
<b>Basin-Wide Snowpack</b>	<b>123%</b>	<b>136%</b>

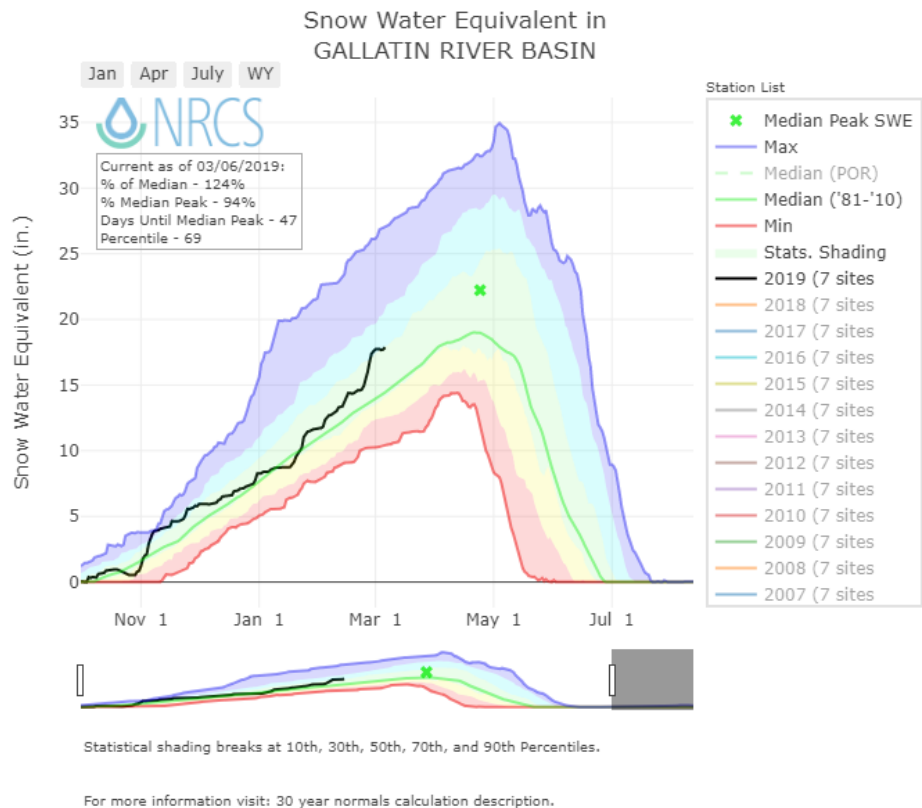
<b>Precipitation</b>	<b>Monthly Percentage of Average</b>	<b>WYTD Percentage of 1981-2010 Average*</b>	<b>WYTD Last Year Percentage of Average</b>
Mountain Precipitation	209%	130%	126%
Valley Precipitation	217%	131%	124%
<b>Basin-Wide Precipitation</b>	<b>210%</b>	<b>130%</b>	<b>126%</b>

\*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

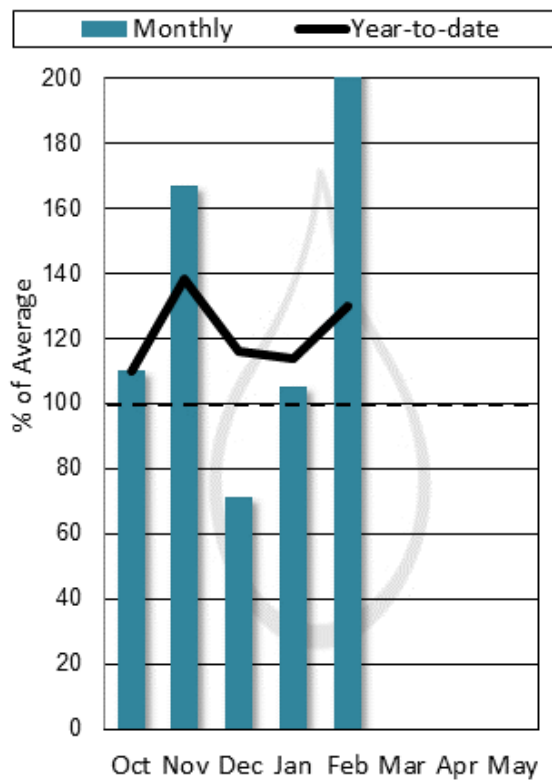
<b>Reservoir Storage</b>	<b>Percentage of Average</b>	<b>Percentage of Capacity (Total)</b>	<b>Last Year Percentage of Average</b>
<b>Basin-Wide Storage</b>	<b>100%</b>	<b>53%</b>	<b>102%</b>

\*See Reservoir Storage Table for storage in individual reservoirs

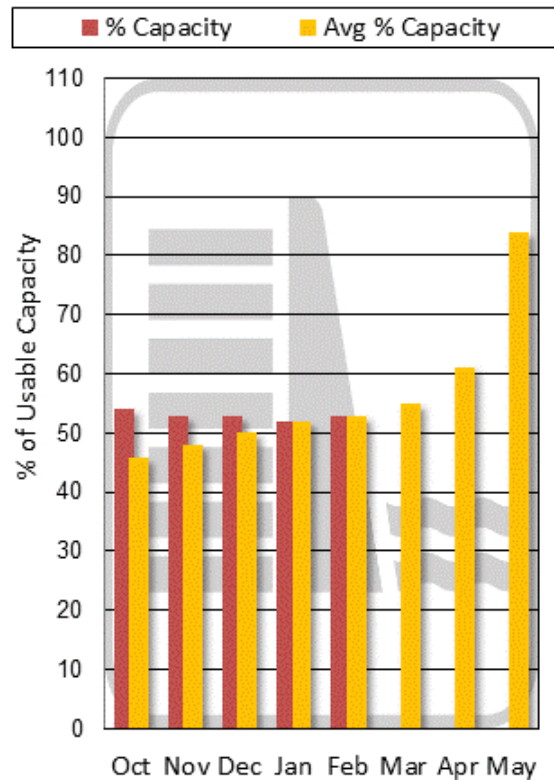
(click on chart below to navigate to [online version](#) with additional features)



### Mountain and Valley Precipitation



### End of Month Reservoir Storage



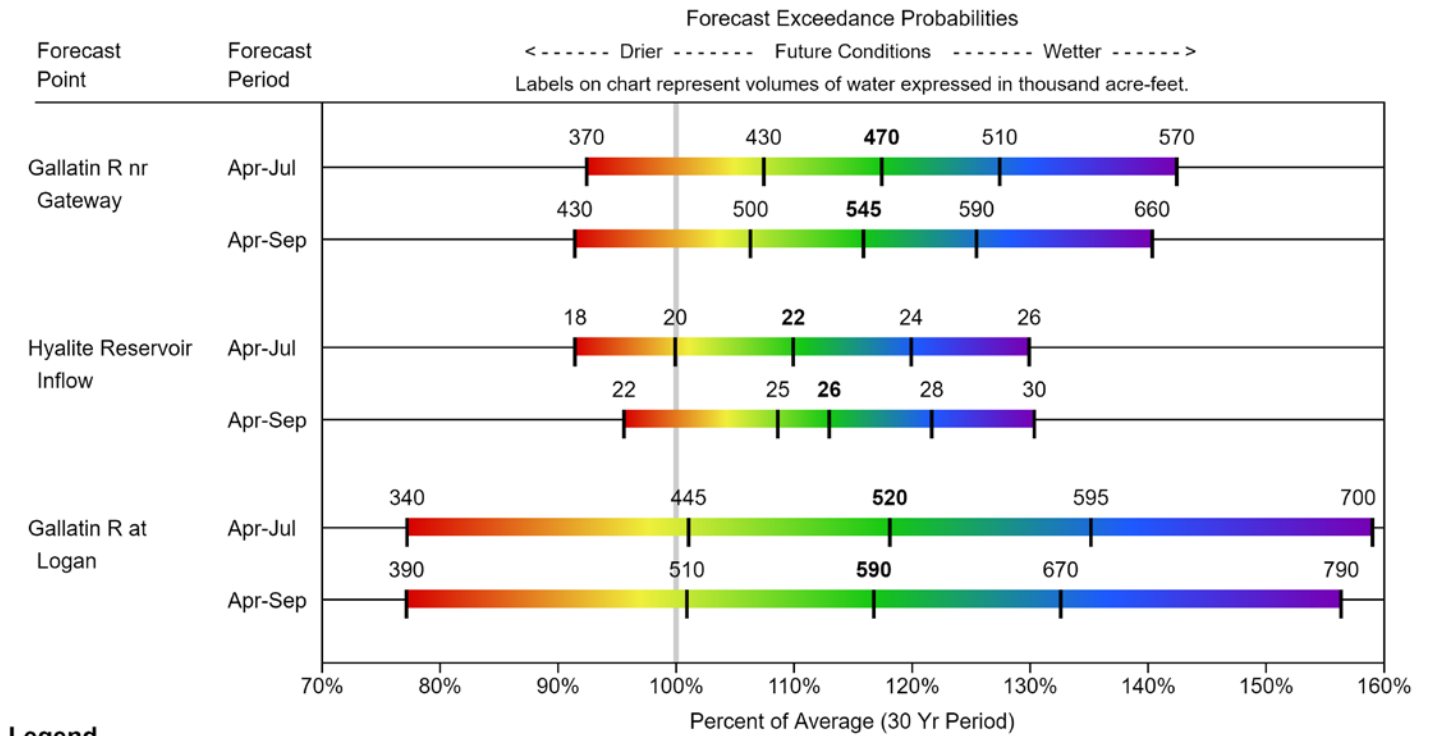
Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.



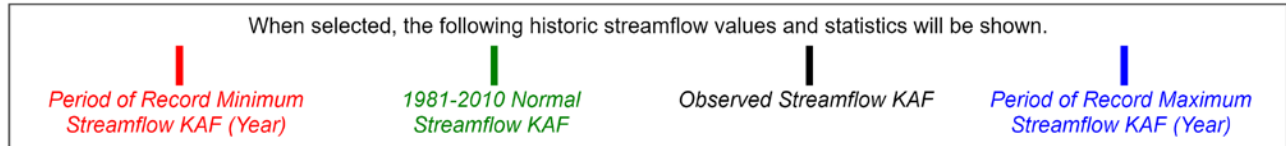
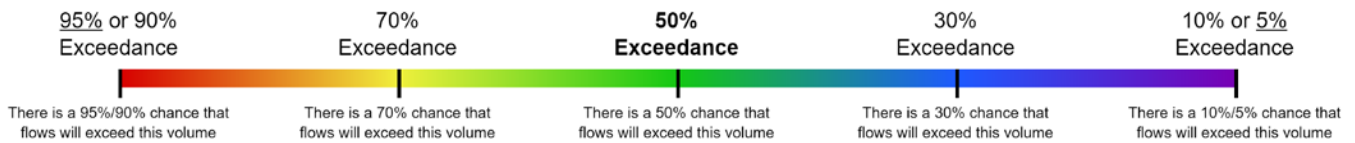
# GALLATIN RIVER BASIN

## Water Supply Forecasts

### March 1, 2019

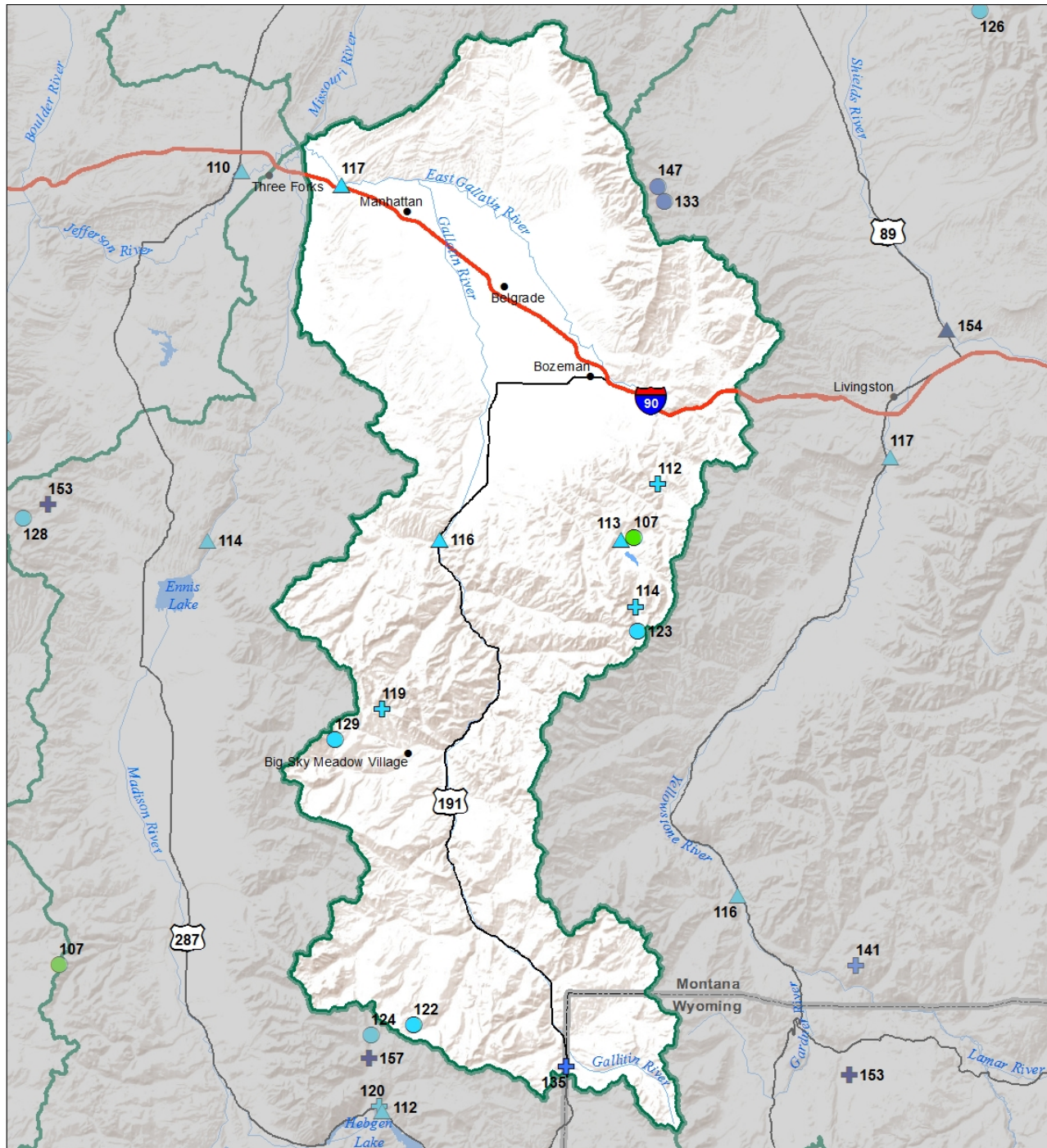


#### Legend



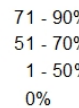
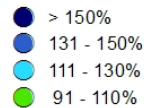
Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

**Gallatin River Basin  
Streamflow Forecast, Snow Water Equivalent  
Percentage of Normal  
March 1, 2019**

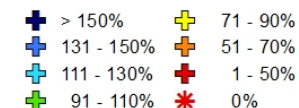


**Snow Water Equivalent  
Percent of Normal**

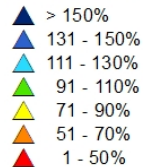
**SNOTEL**



**Snowcourse**

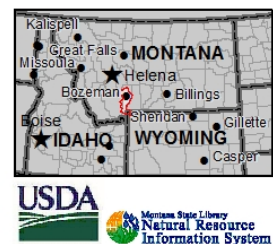
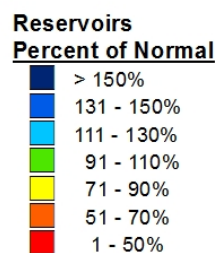
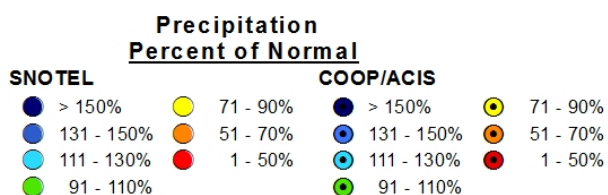
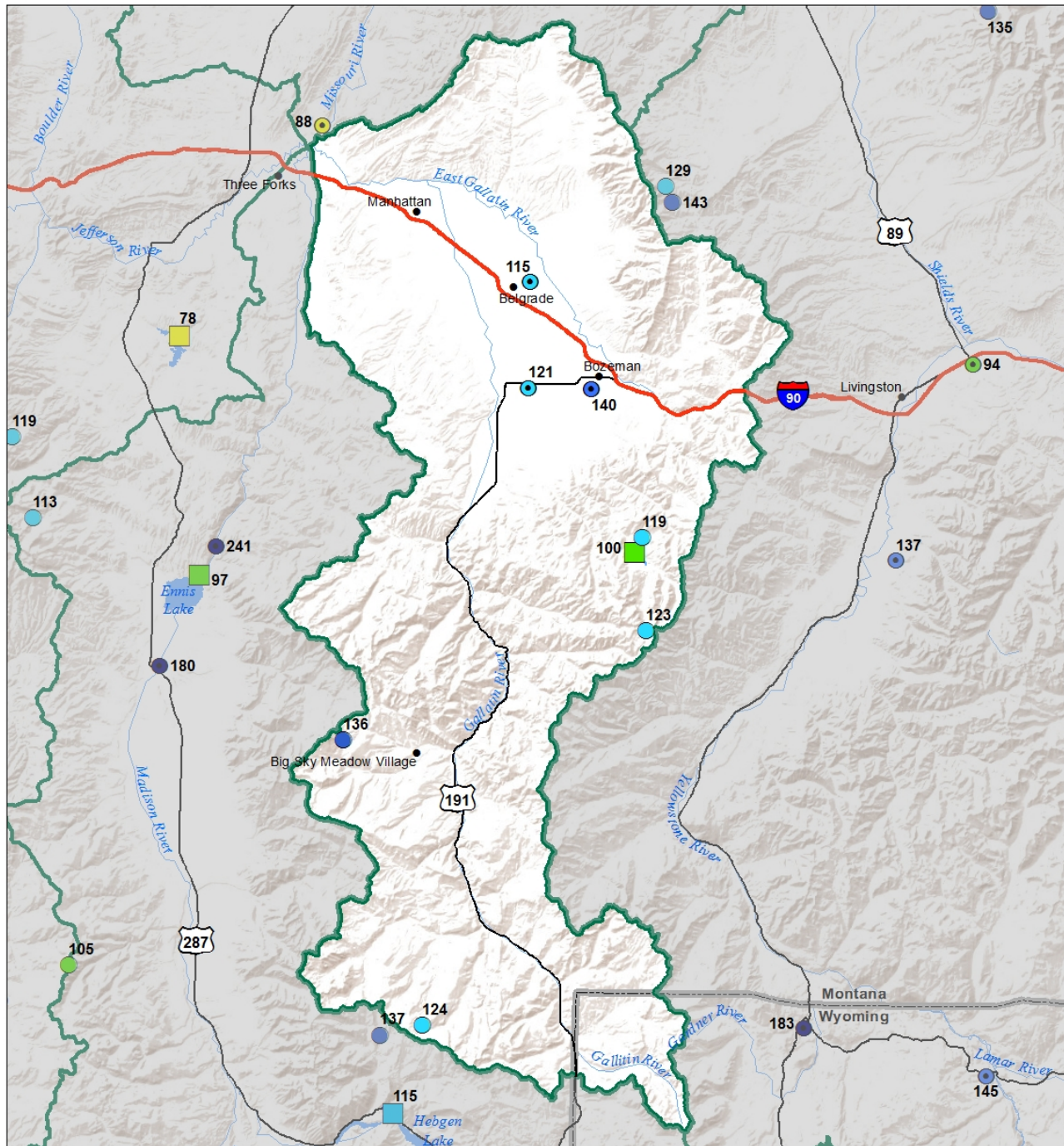


**Streamflow Forecast  
Percent of Average Flows**



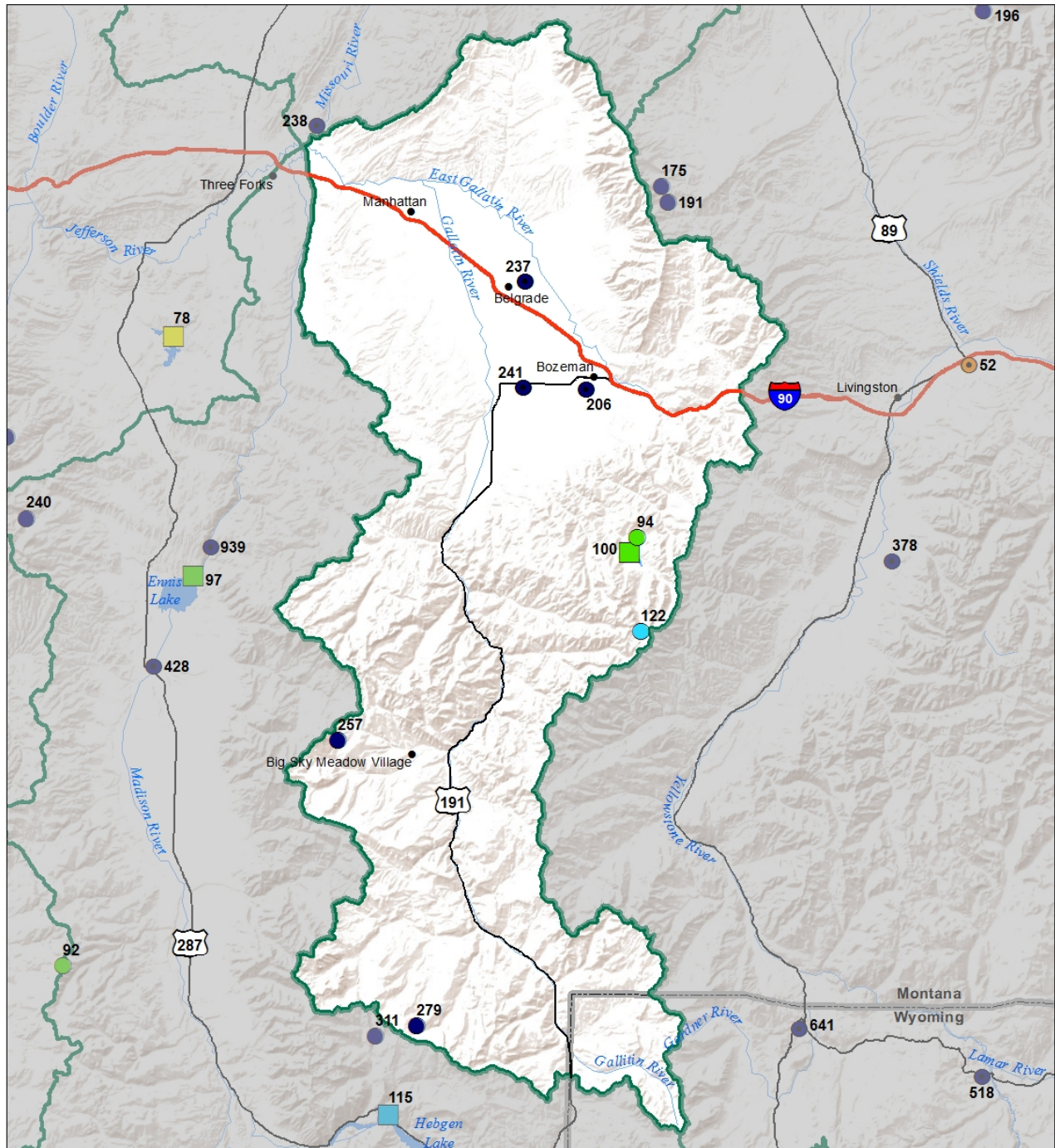


# Gallatin River Basin Water Year to Date Precipitation and Reservoir Levels Percentage of Normal March 1, 2019





**Gallatin River Basin**  
**Monthly Precipitation and Reservoir Levels**  
**Percentage of Normal**  
**March 1, 2019 (February 1, 2019 - March 1, 2019)**



**Precipitation  
Percent of Normal**

**SNOTEL**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

**COOP/ACIS**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

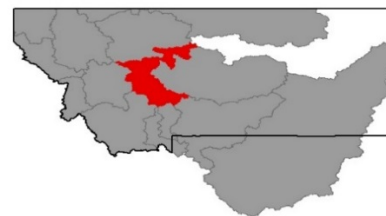
- 71 - 90%
- 51 - 70%
- 1 - 50%

**Reservoirs  
Percent of Normal**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%







## Headwaters Mainstem (Missouri) River Basin

February in Helena and the Missouri River Valley was a great month for precipitation. A basin-wide storm dropped snow for the first two weeks of the month, followed by a week of largely dry weather. This allowed all basin SNOTEL sites to be at or above normal for the date of February 15<sup>th</sup>. End-of-month Snow Water Equivalent (SWE) in the Missouri River Valley was largely impacted by a whopper of a snow storm that occurred throughout the last week of February; 1 to 1.7" of SWE was added to the basin in the last three days alone. This brought snowpack totals into record breaking territory, with SWE increases ranging between 187% of normal for the month of February in the Nevada Mountains and 254% of normal at Tizer Basin SNOTEL in the Elkhorns. By the end of the month, [Tizer Basin SNOTEL and Pickfoot Creek SNOTEL](#) were both at their 2<sup>nd</sup> highest February SWE on record, and Boulder Mountain SNOTEL had the biggest February SWE increase than at any other time in its 41-year history. Streamflow forecasts issued on March 1<sup>st</sup> for the April 1<sup>st</sup> – July 31<sup>st</sup> period range across the basin from near average to above average (found below). The critical spring months are still yet to come, but for this point in the year the snowpack is in good shape as we progress towards spring.

### Headwaters Missouri Mainstem River Basin Data Summary

<b>Snowpack</b>	<b>Percent of 1981-2010 Normal (Median)</b>	<b>Last Year Percentage of Normal (Median)</b>
HEADWATERS MAINSTEM	126%	175%
SMITH-JUDITH-MUSSELSHELL	123%	137%
SUN-TETON-MARIAS	91%	153%
MAINSTEM ab FT PECK RES	113%	150%
MILK RIVER BASIN	170%	153%
<b>Basin-Wide Snowpack</b>	<b>114%</b>	<b>150%</b>

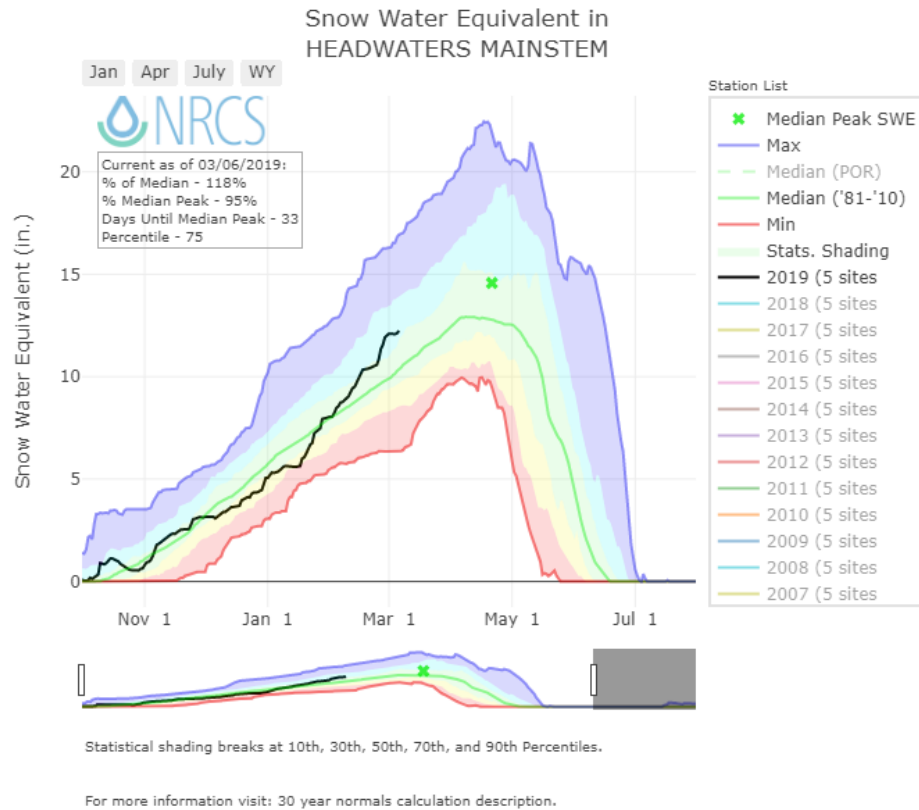
<b>Precipitation</b>	<b>Monthly Percentage of Average</b>	<b>WYTD Percentage of 1981-2010 Average*</b>	<b>WYTD Last Year Percentage of Average</b>
Mountain Precipitation	202%	121%	143%
Valley Precipitation	767%	165%	213%
<b>Basin-Wide Precipitation</b>	<b>220%</b>	<b>123%</b>	<b>145%</b>

\*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

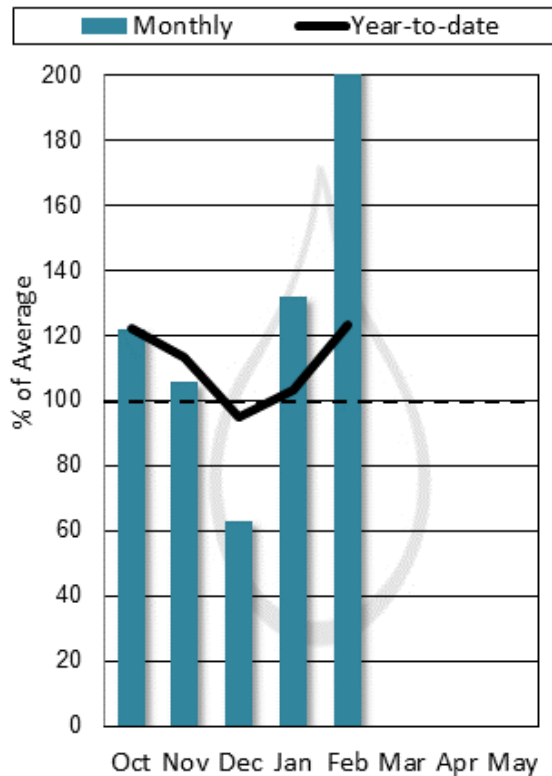
<b>Reservoir Storage</b>	<b>Percentage of Average</b>	<b>Percentage of Capacity (Total)</b>	<b>Last Year Percentage of Average</b>
<b>Basin-Wide Storage</b>	<b>115%</b>	<b>79%</b>	<b>114%</b>

\*See Reservoir Storage Table for storage in individual reservoirs

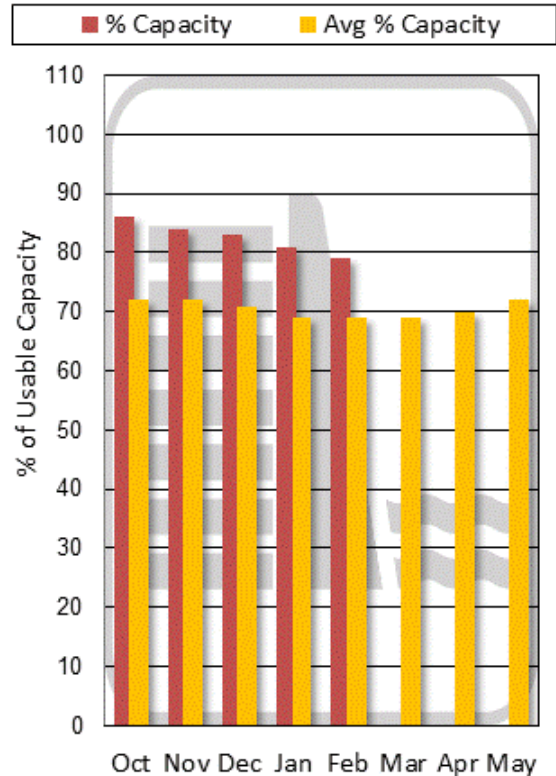
(click on chart below to navigate to [online version](#) with additional features)



### Mountain and Valley Precipitation



### End of Month Reservoir Storage



Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.



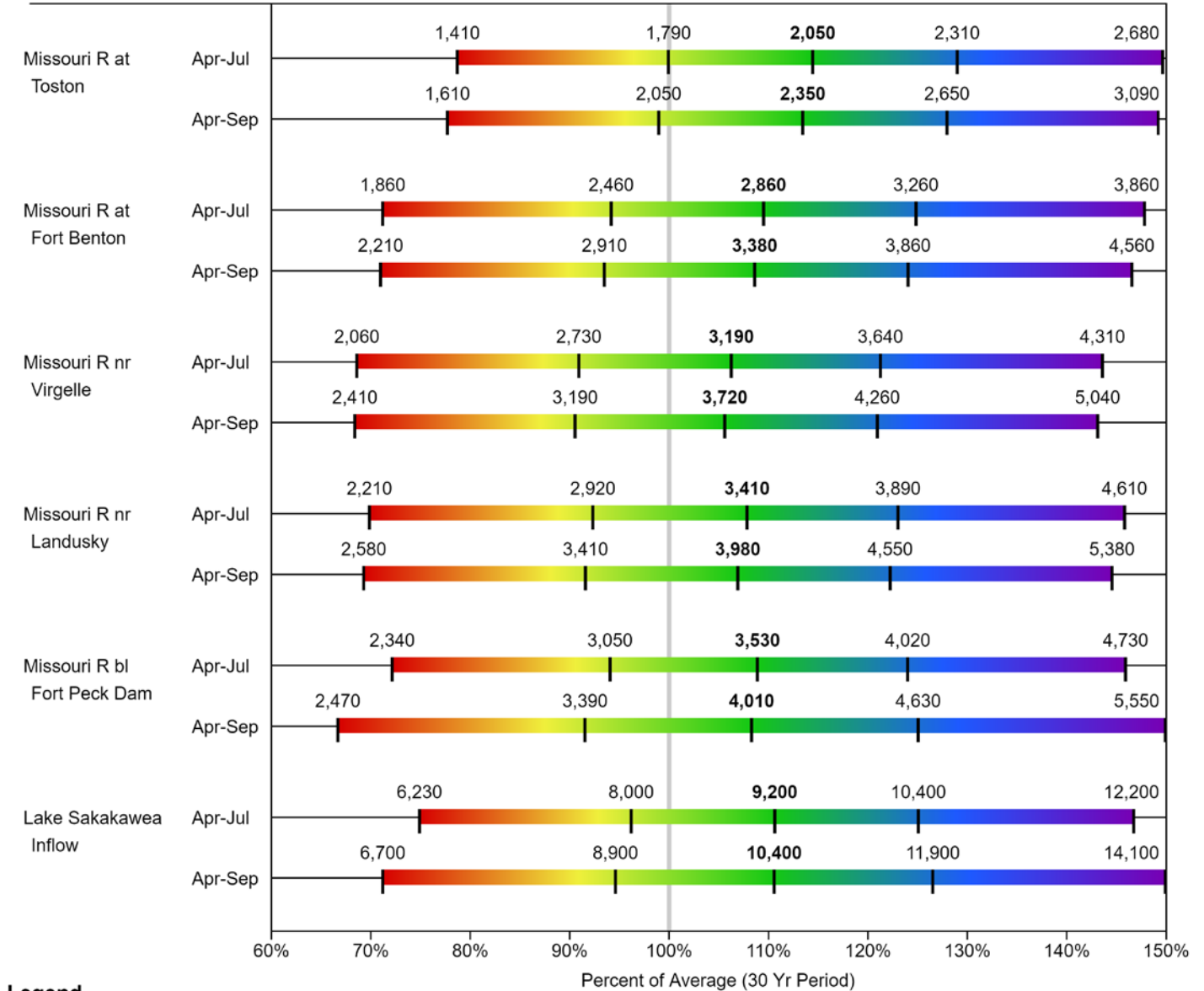
# MISSOURI MAINSTEM BASIN

## Water Supply Forecasts

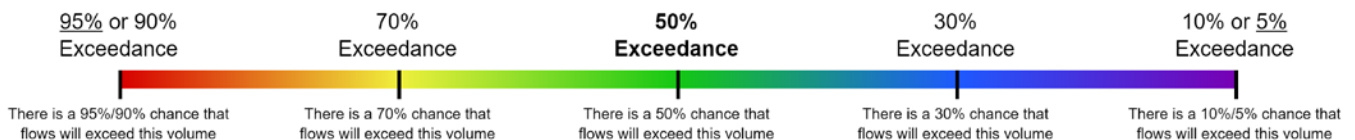
### March 1, 2019

#### Forecast Exceedance Probabilities

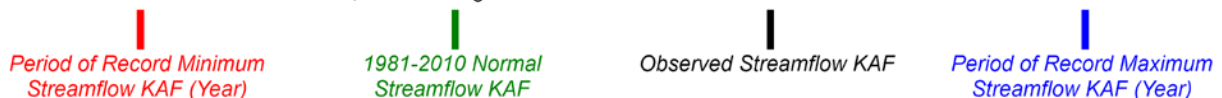
<----- Drier ----- Future Conditions ----- Wetter ----->  
Labels on chart represent volumes of water expressed in thousand acre-feet.



#### Legend

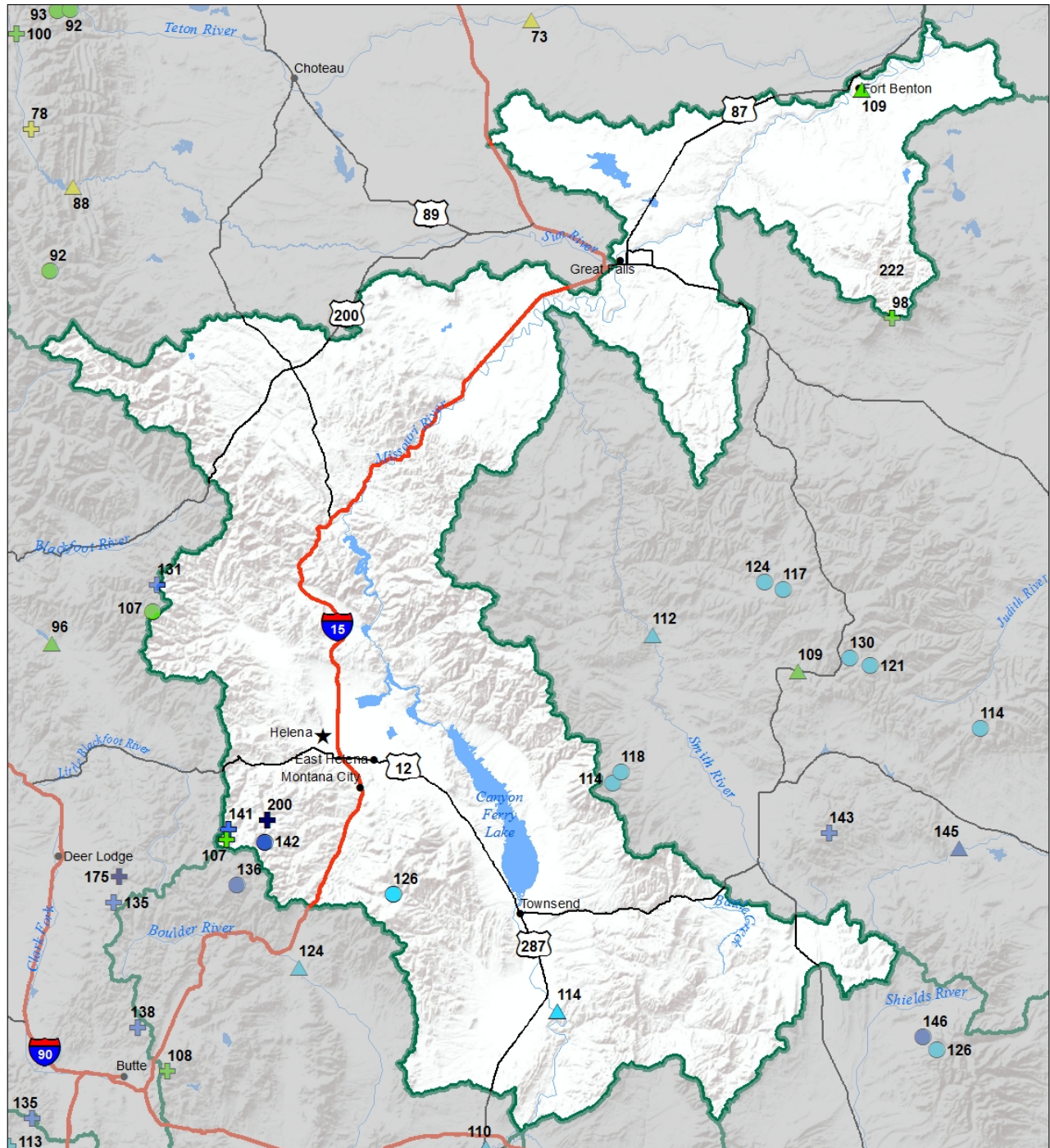


When selected, the following historic streamflow values and statistics will be shown.



Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

# Headwaters Mainstem (Missouri) River Basin Streamflow Forecast, Snow Water Equivalent Percentage of Normal March 1, 2019



## **Snow Water Equivalent Percent of Normal**

### **SNOTEL**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

- 71 - 90%
- 51 - 70%
- 1 - 50%
- 0%

### **Snowcourse**

- ⊕ > 150%
- ⊕ 131 - 150%
- ⊕ 111 - 130%
- ⊕ 91 - 110%

- ⊕ 71 - 90%
- ⊕ 51 - 70%
- ⊕ 1 - 50%
- ⊕ 0%

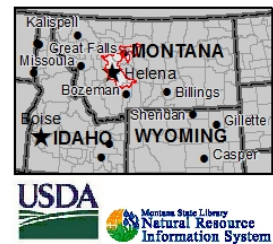
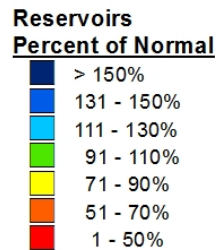
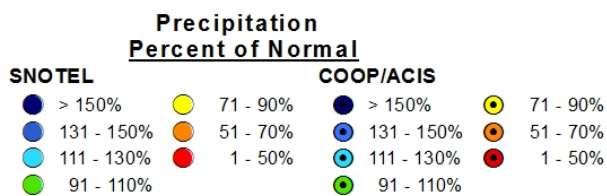
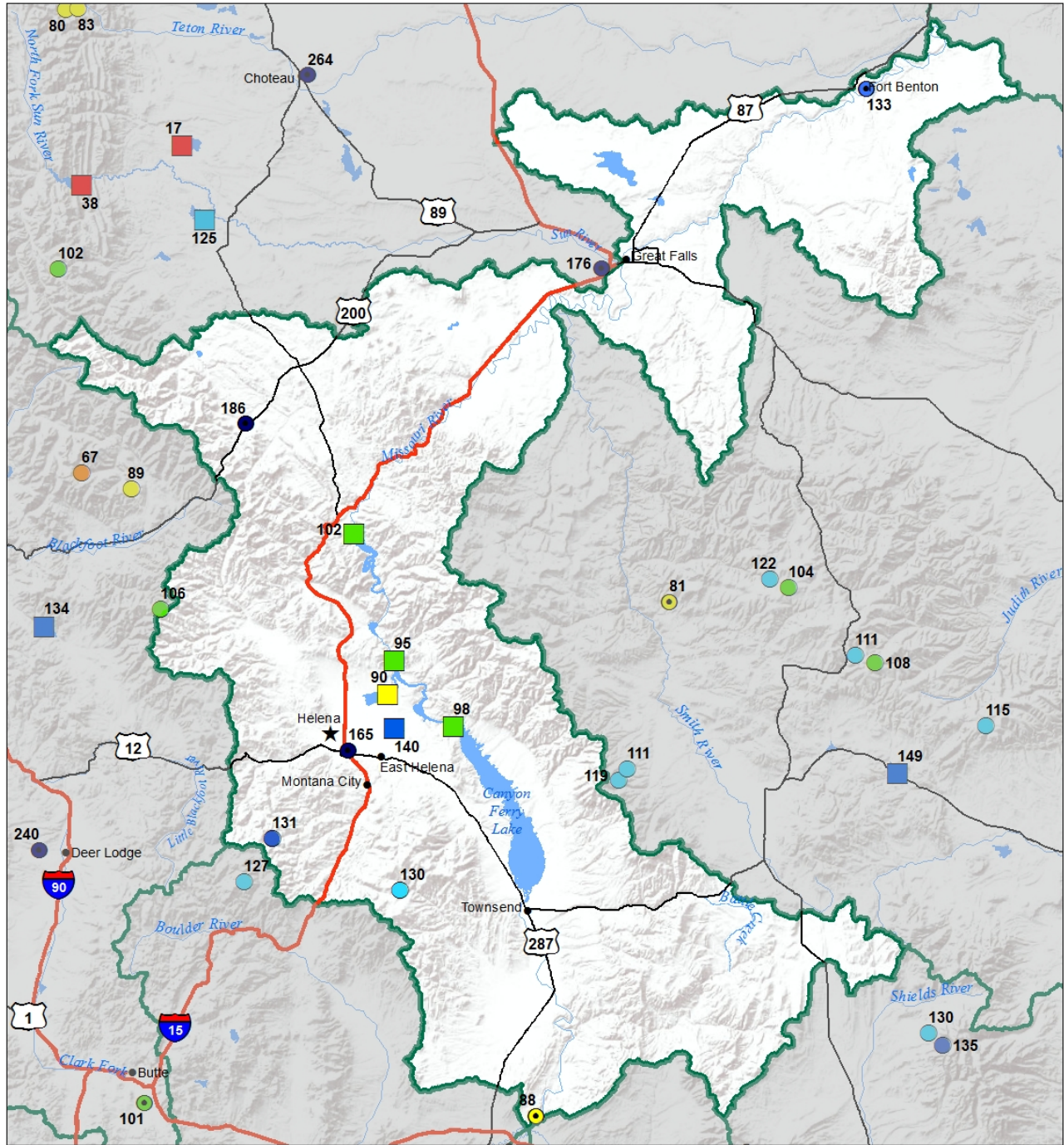
## **Streamflow Forecast Percent of Average Flows**

- ▲ > 150%
- ▲ 131 - 150%
- ▲ 111 - 130%
- ▲ 91 - 110%
- ▲ 71 - 90%
- ▲ 51 - 70%
- ▲ 1 - 50%



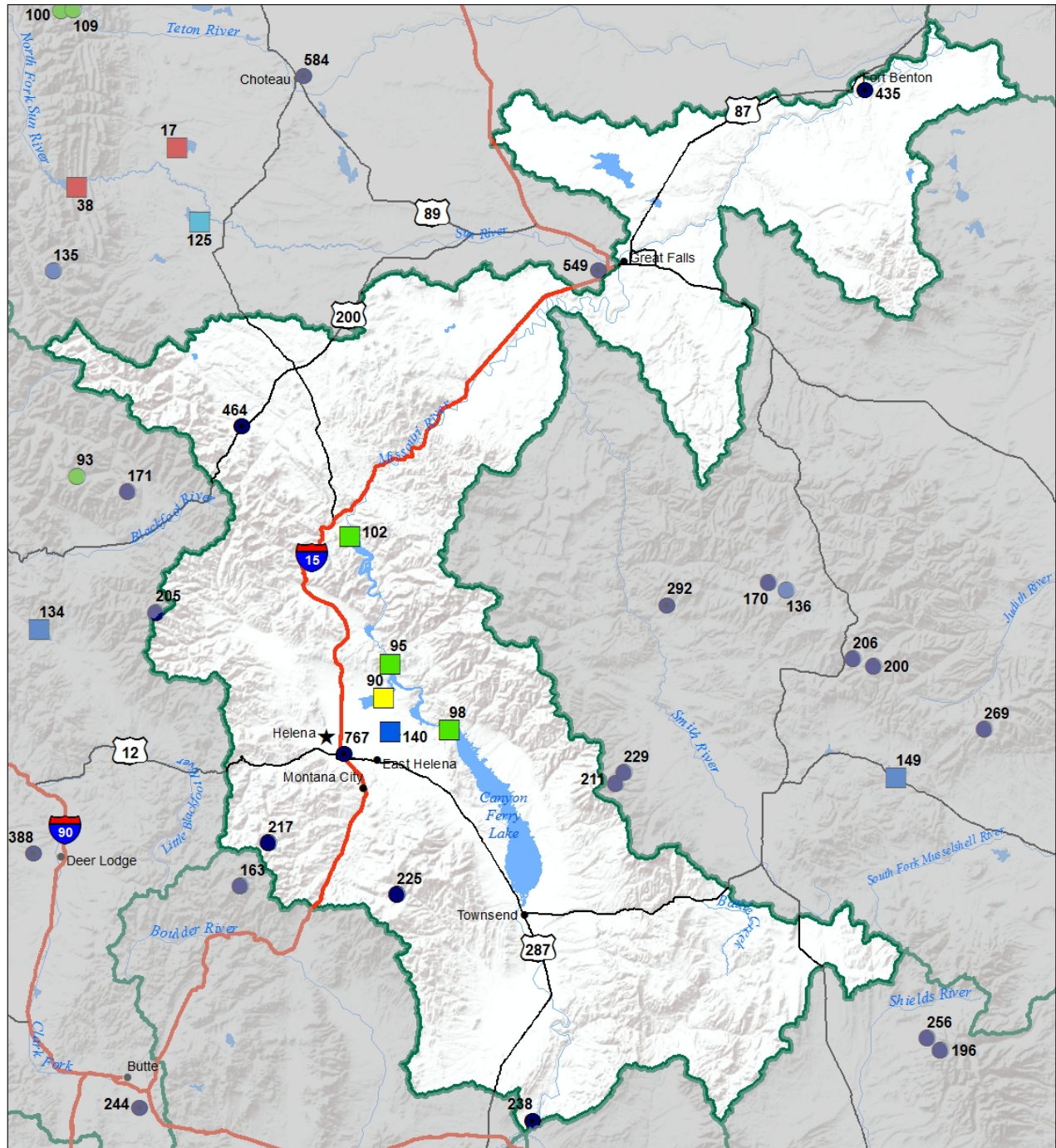


# Headwaters Mainstem (Missouri) River Basin Water Year to Date Precipitation and Reservoir Levels Percentage of Normal March 1, 2019





# Headwaters Mainstem (Missouri) River Basin Monthly Precipitation and Reservoir Levels Percentage of Normal March 1, 2019 (February 1, 2019 - March 1, 2019)



## Precipitation Percent of Normal

### SNOTEL

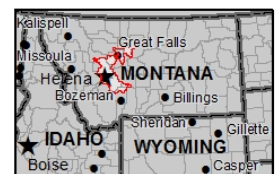
- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

### COOP/ACIS

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

## Reservoirs Percent of Normal

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%





## Smith-Judith-Musselshell River Basin



Consistent snowfall during the month of February has boosted snowpack totals in the Smith-Judith-Musselshell River basin to well above normal for March 1<sup>st</sup>. Snowfall for the month of February was more than 200% of the monthly normal, with the Big Belt and Little Belt Mountains receiving significant snowfall. At the beginning of the month the sites located in the Big Belts were below normal for the date, but the abundant snowfall during February helped increase snowpack totals to above normal (114-118%) on March 1<sup>st</sup>. Quite the comeback! [Boulder Mountain SNOTEL](#) tied February of 1979 for the snowiest February on record, receiving 6.0" of snow water equivalent (SWE) during the month, while the lower elevation Pickfoot Creek SNOTEL recorded the second highest SWE increase during the month. Many sites in the Little Belts were second highest on record for the month, helping to improve water supply forecasts for the spring and summer. Forecasts issued on March 1<sup>st</sup> for the April 1<sup>st</sup> – July 31<sup>st</sup> period indicate above-average water supply for this spring and summer, but the critical March – June months are still to come. It's still too early to call at this point, and largely depends on spring snowfall and rain, but for now conditions are looking good for irrigators, boaters and fishermen in the region.

### Smith Judith Musselshell River Basin Data Summary

<b>Snowpack</b>	<b>Percent of 1981-2010 Normal (Median)</b>	<b>Last Year Percentage of Normal (Median)</b>
SMITH	123%	140%
HIGHWOOD	145%	83%
JUDITH	121%	131%
MUSSELSHELL	135%	178%
<b>Basin-Wide Snowpack</b>	<b>123%</b>	<b>137%</b>

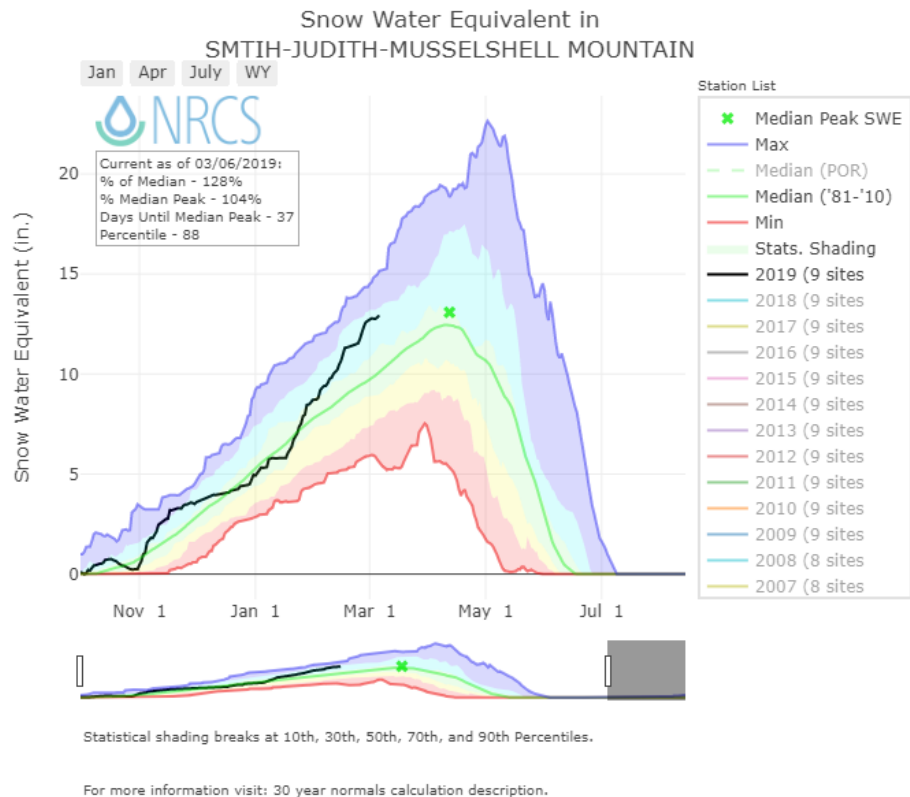
<b>Precipitation</b>	<b>Monthly Percentage of Average</b>	<b>WYTD Percentage of 1981-2010 Average*</b>	<b>WYTD Last Year Percentage of Average</b>
Mountain Precipitation	197%	116%	122%
Valley Precipitation	208%	111%	145%
<b>Basin-Wide Precipitation</b>	<b>197%</b>	<b>116%</b>	<b>123%</b>

\*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

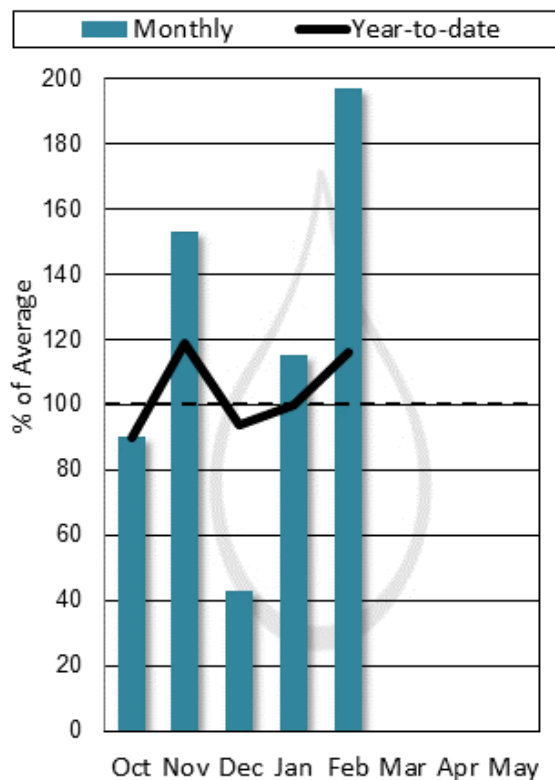
<b>Reservoir Storage</b>	<b>Percentage of Average</b>	<b>Percentage of Capacity (Total)</b>	<b>Last Year Percentage of Average</b>
<b>Basin-Wide Storage</b>	<b>153%</b>	<b>90%</b>	<b>135%</b>

\*See Reservoir Storage Table for storage in individual reservoirs

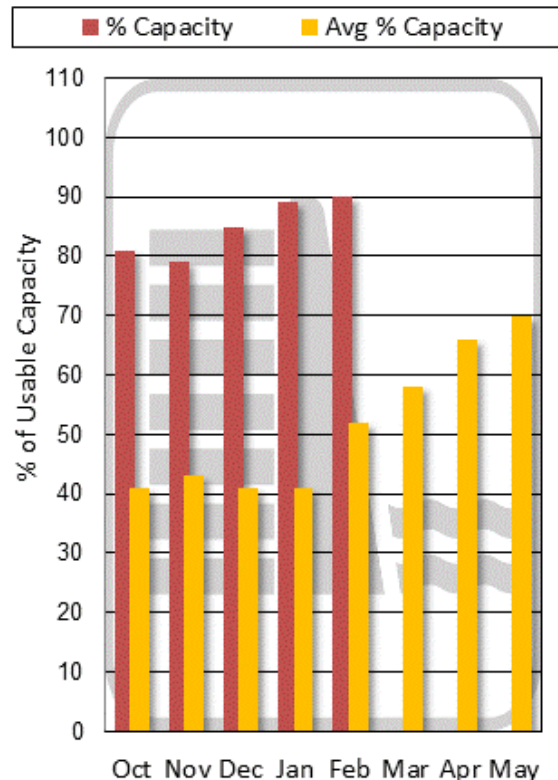
(click on chart below to navigate to [online version](#) with additional features)



### Mountain and Valley Precipitation



### End of Month Reservoir Storage



Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.



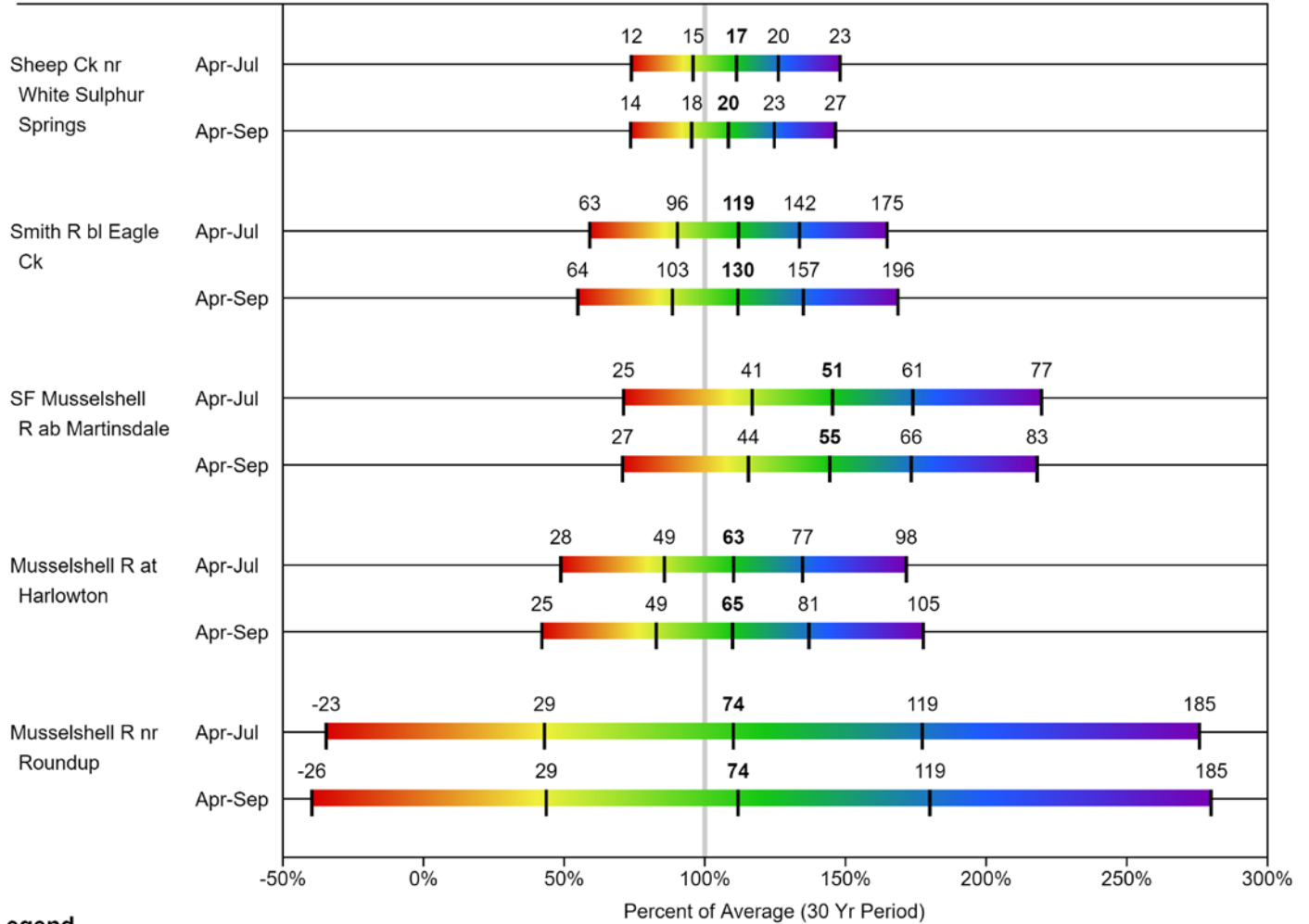
# SMITH-JUDITH-MUSSELSHELL

## Water Supply Forecasts

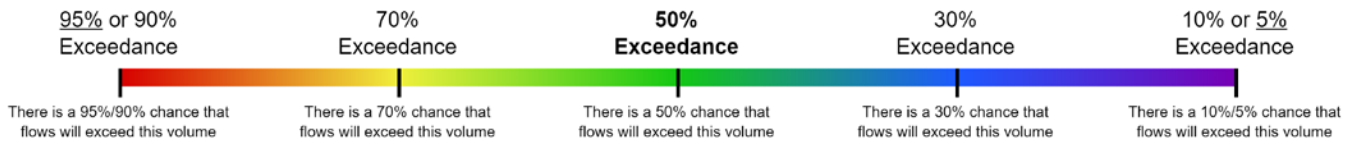
### March 1, 2019

#### Forecast Exceedance Probabilities

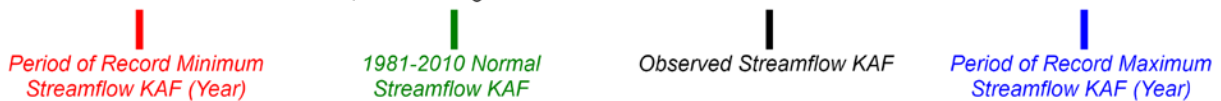
<----- Drier ----- Future Conditions ----- Wetter ----->  
 Labels on chart represent volumes of water expressed in thousand acre-feet.



#### Legend

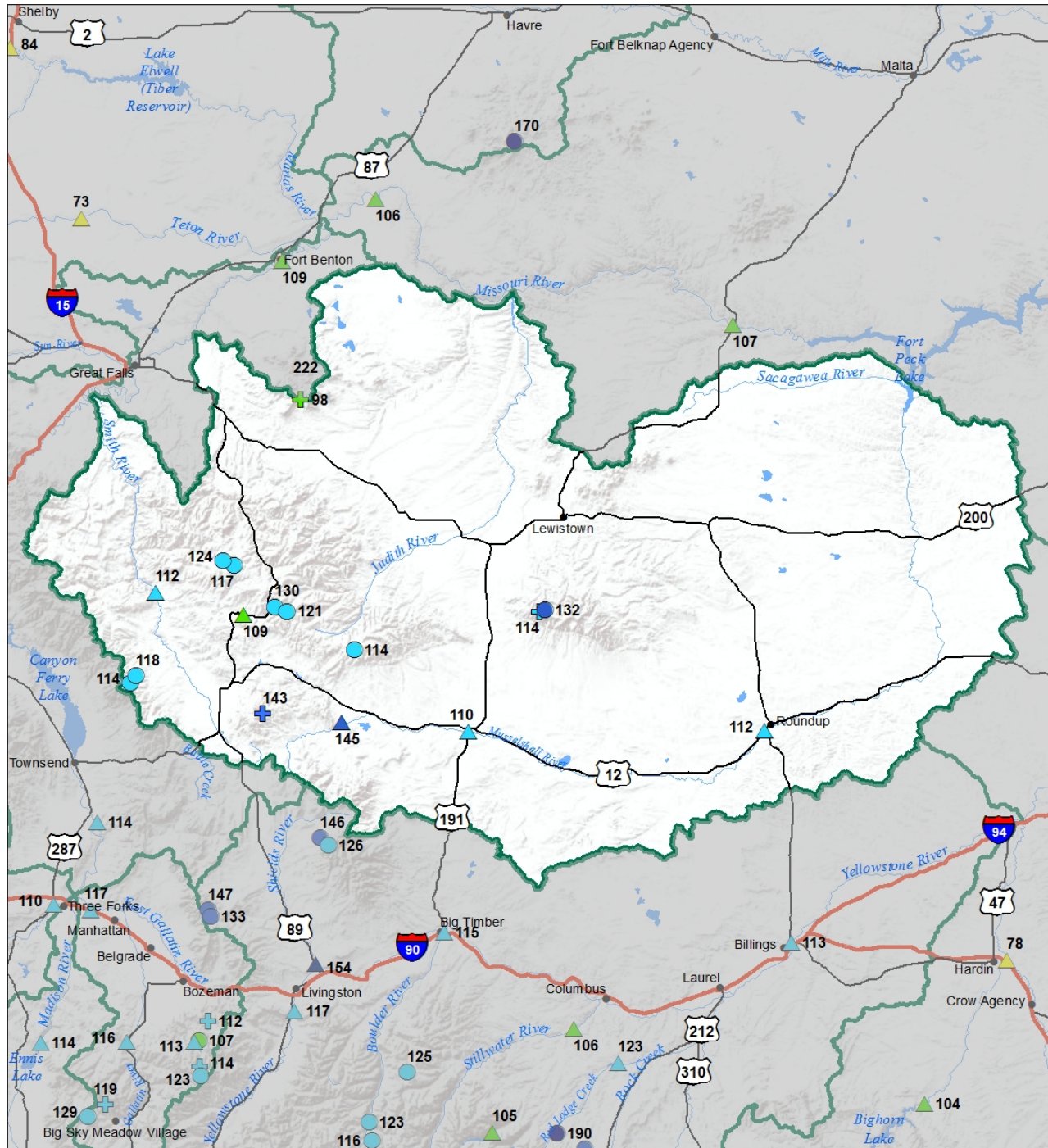


When selected, the following historic streamflow values and statistics will be shown.



Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

**Smith-Judith-Musselshell River Basin  
Streamflow Forecast, Snow Water Equivalent  
Percentage of Normal  
March 1, 2019**



**Snow Water Equivalent  
Percent of Normal**

**SNOTEL**

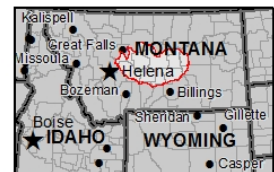
- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%
- \*

**Snowcourse**

- ✚ > 150%
- ✚ 131 - 150%
- ✚ 111 - 130%
- ✚ 91 - 110%
- ✚ 71 - 90%
- ✚ 51 - 70%
- ✚ 1 - 50%
- ✚ \*

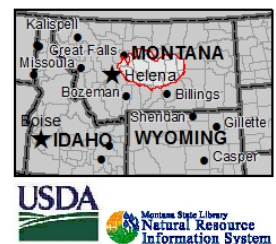
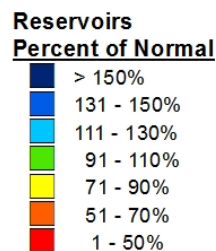
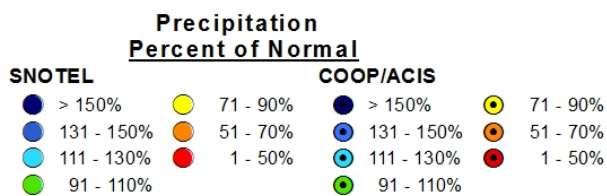
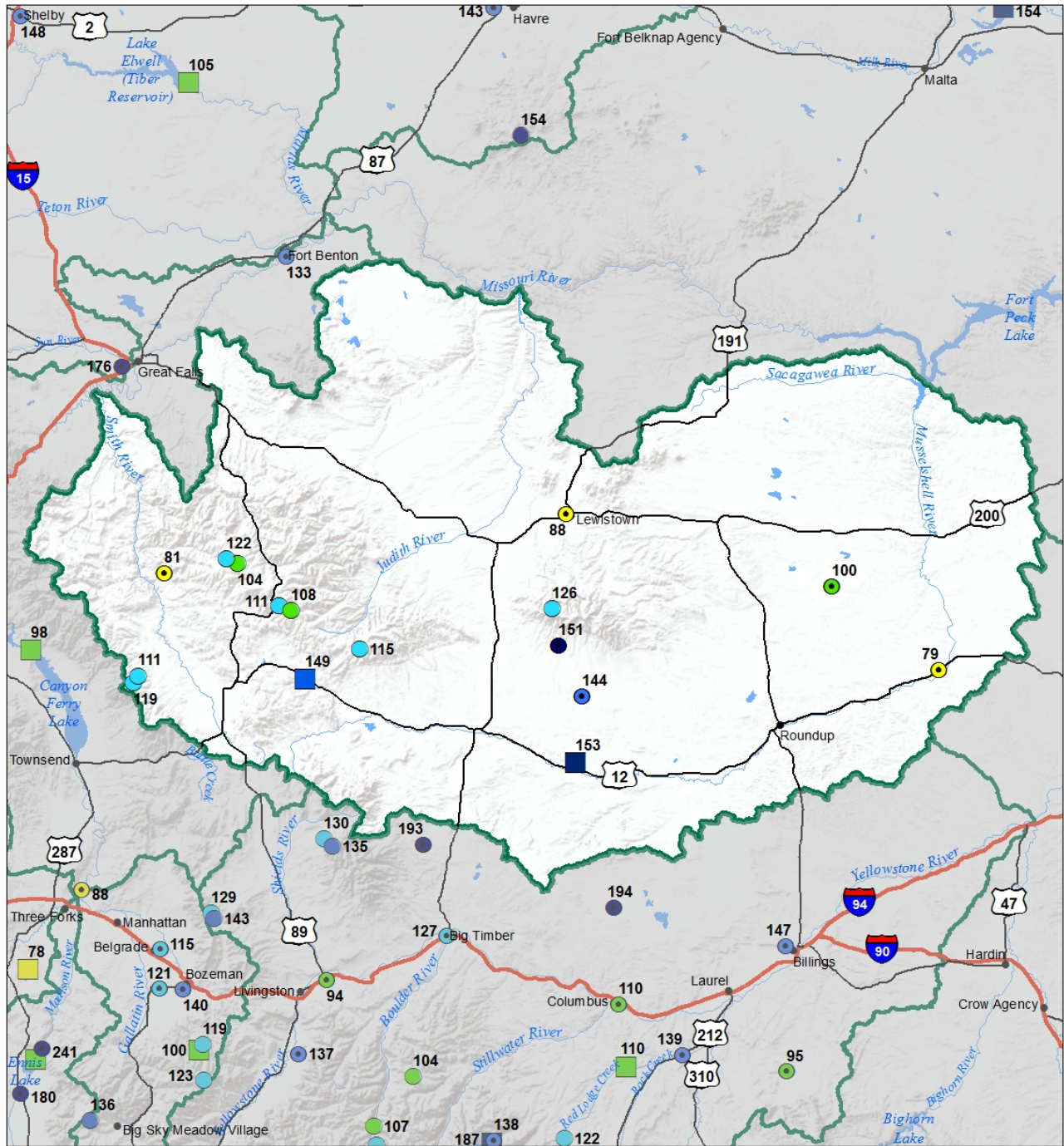
**Streamflow Forecast  
Percent of Average Flows**

- ▲ > 150%
- ▲ 131 - 150%
- ▲ 111 - 130%
- ▲ 91 - 110%
- ▲ 71 - 90%
- ▲ 51 - 70%
- ▲ 1 - 50%



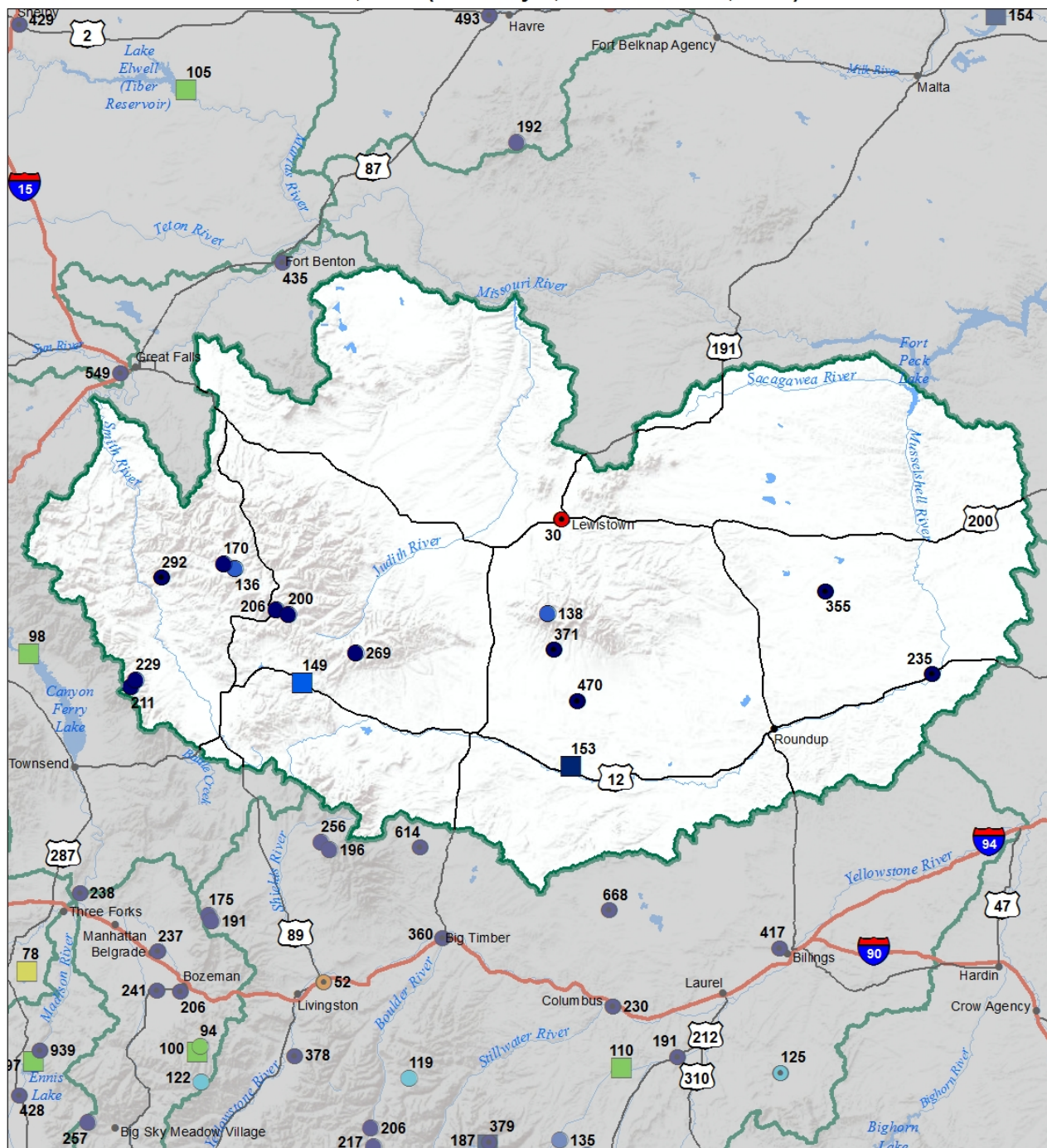


**Smith-Judith-Musselshell River Basin**  
**Water Year to Date Precipitation and Reservoir Levels**  
**Percentage of Normal**  
**March 1, 2019**





**Smith-Judith-Musselshell River Basin**  
**Monthly Precipitation and Reservoir Levels**  
**Percentage of Normal**  
**March 1, 2019 (February 1, 2019 - March 1, 2019)**



**Precipitation  
Percent of Normal**

**SNOTEL**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

**COOP/ACIS**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%

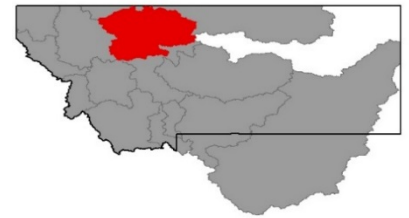
**Reservoirs  
Percent of Normal**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%





## Sun-Teton-Marias River Basin



Snowpack conditions in the greater Sun-Teton-Marias region improved during the month of February due to consistent snowfall throughout the month. Snowpack in this region was below normal on February 1<sup>st</sup> (74% to 88%) but increased to [78% to 100%](#) of normal for March 1<sup>st</sup>. This month the first ground measurements were made within the Bob Marshall Wilderness in the Upper Sun River basin. The low elevation Cabin Creek snowcourse is currently below normal at 78%, but the higher elevation Wrong Creek snowcourse was 100% of normal. Snowpack outside the wilderness saw decent gains over the month and improved from well below normal on February 1<sup>st</sup> to slightly below and near normal on March 1<sup>st</sup>. Overall, the improvements in snowpack percentages during the month weren't enough to get streamflow prospects back to normal, and streamflow forecasts issued on March 1<sup>st</sup> are slightly below average for the April 1<sup>st</sup> – July 31<sup>st</sup> period. With the spring months left to come, which can produce significant precipitation, there's a lot of time left to improve before runoff occurs. Let's hope wetter weather patterns stay in place a little while longer.

### *Sun-Teton-Marias River Basin Data Summary*

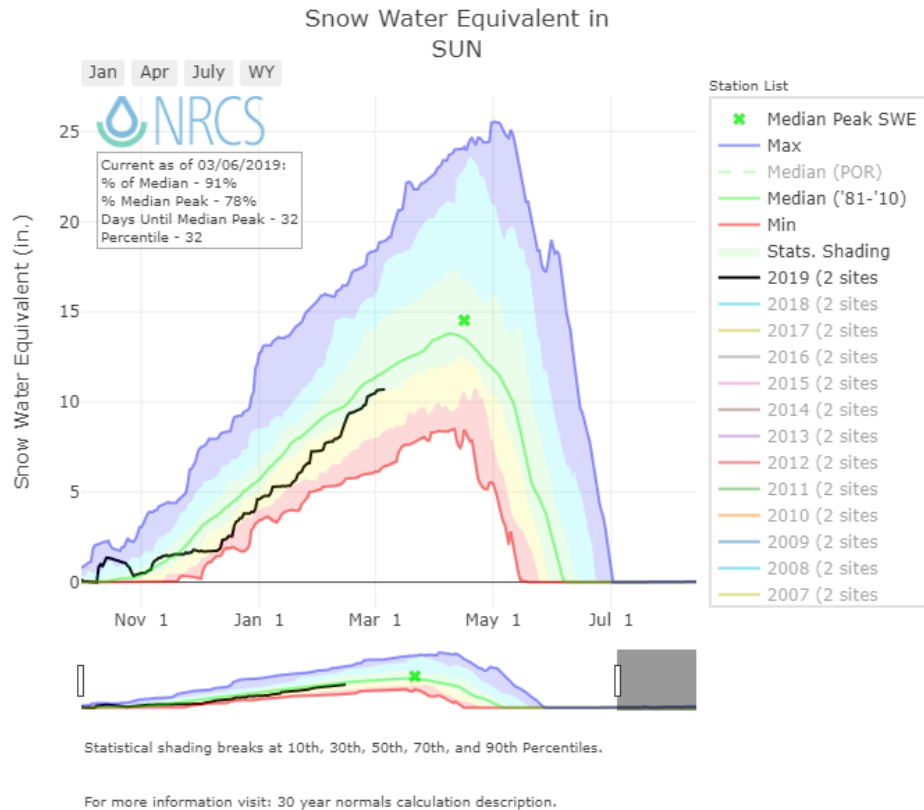
<b><i>Snowpack</i></b>	<b>Percent of 1981-2010 Normal (Median)</b>	<b>Last Year Percentage of Normal (Median)</b>
<i>SUN</i>	92%	170%
<i>TETON</i>	94%	150%
<i>MARIAS</i>	90%	141%
<b>Basin-Wide Snowpack</b>	<b>91%</b>	<b>153%</b>

<b><i>Precipitation</i></b>	<b>Monthly Percentage of Average</b>	<b>WYTD Percentage of 1981-2010 Average*</b>	<b>WYTD Last Year Percentage of Average</b>
Mountain Precipitation	112%	89%	143%
Valley Precipitation	421%	217%	252%
<b>Basin-Wide Precipitation</b>	<b>129%</b>	<b>97%</b>	<b>150%</b>

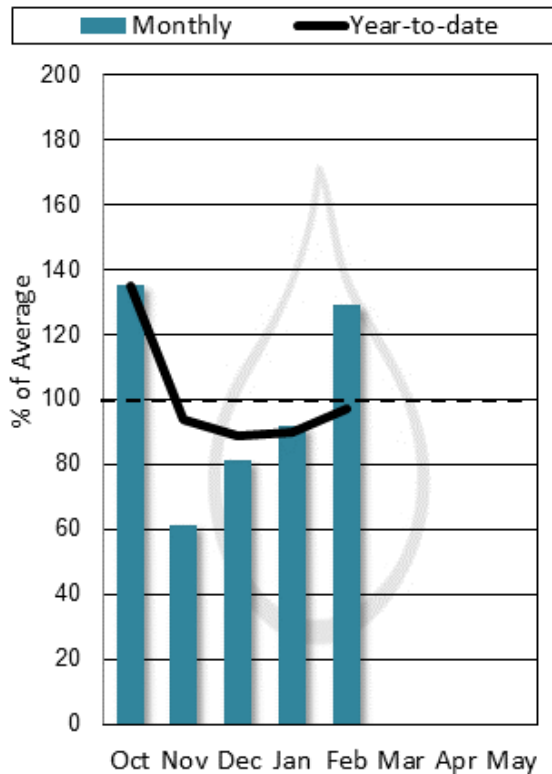
\*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

<b><i>Reservoir Storage</i></b>	<b>Percentage of Average</b>	<b>Percentage of Capacity (Total)</b>	<b>Last Year Percentage of Average</b>
<b>Basin-Wide Storage</b>	<b>103%</b>	<b>53%</b>	<b>97%</b>

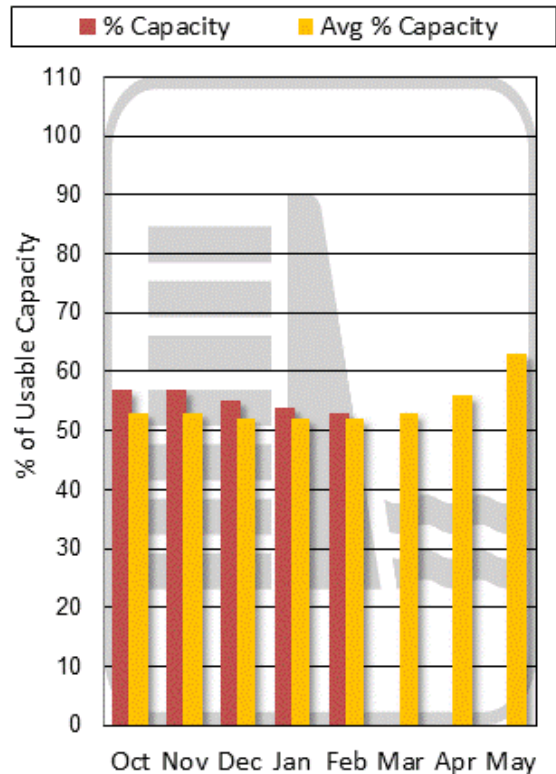
(click on chart below to navigate to [online version](#) with additional features)



### Mountain and Valley Precipitation



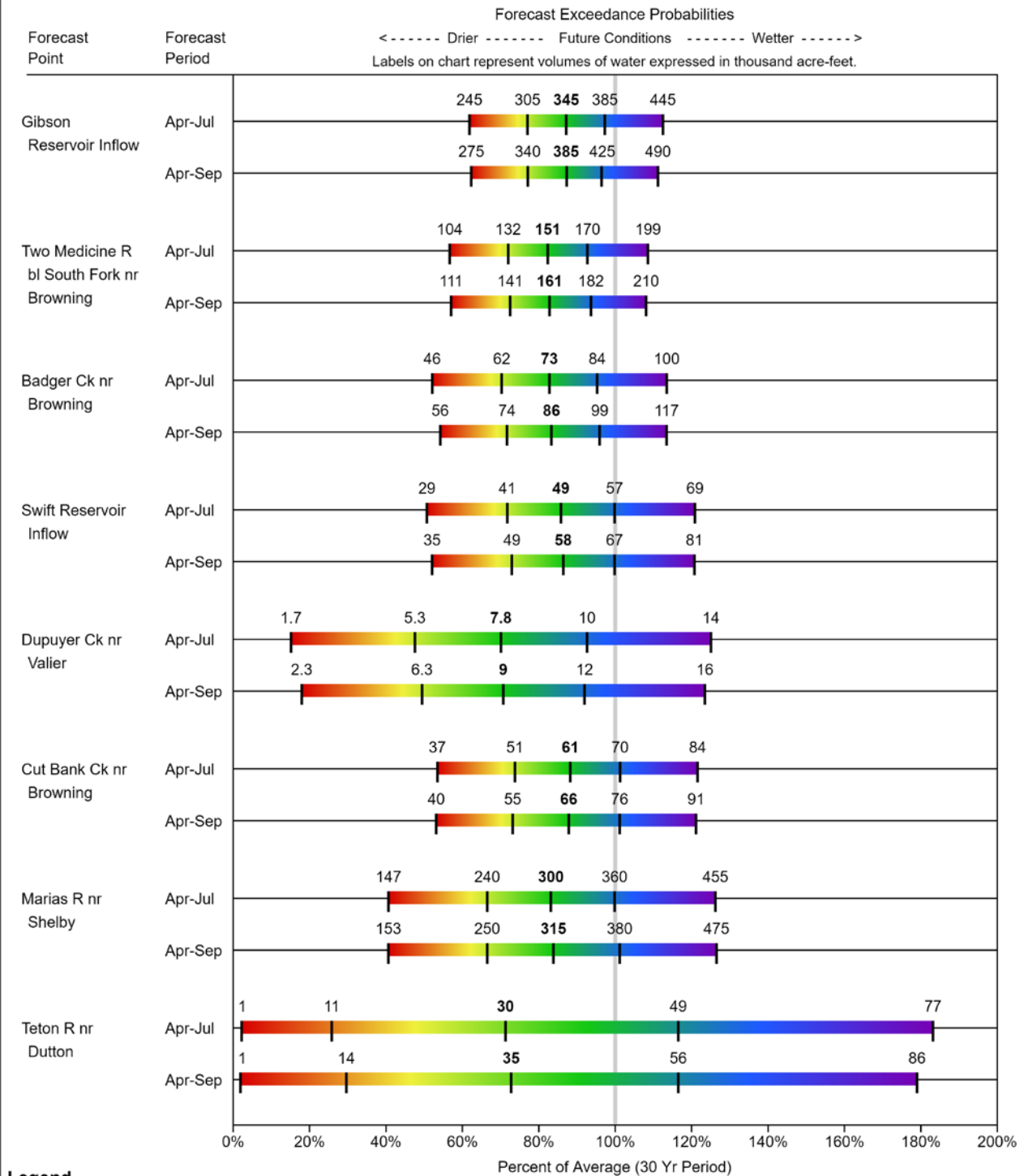
### End of Month Reservoir Storage



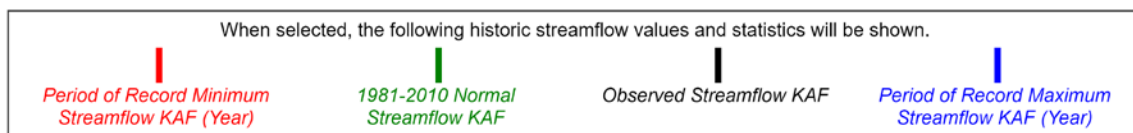
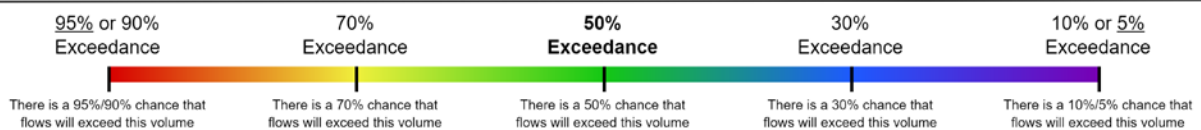
Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.



**SUN-TETON-MARIAS**  
**Water Supply Forecasts**  
**March 1, 2019**

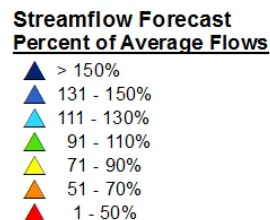
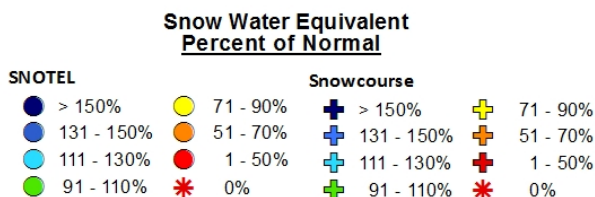
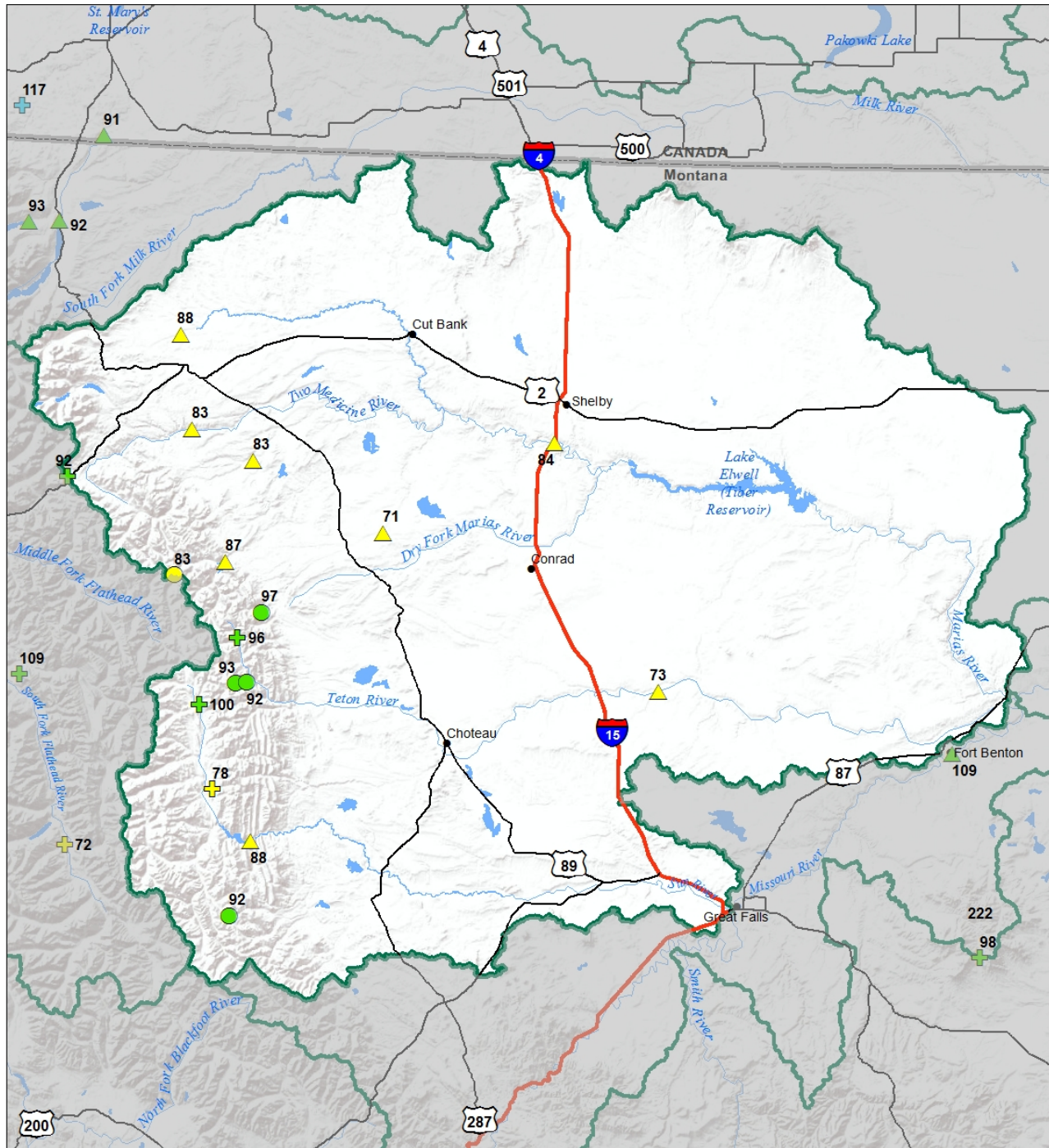


**Legend**



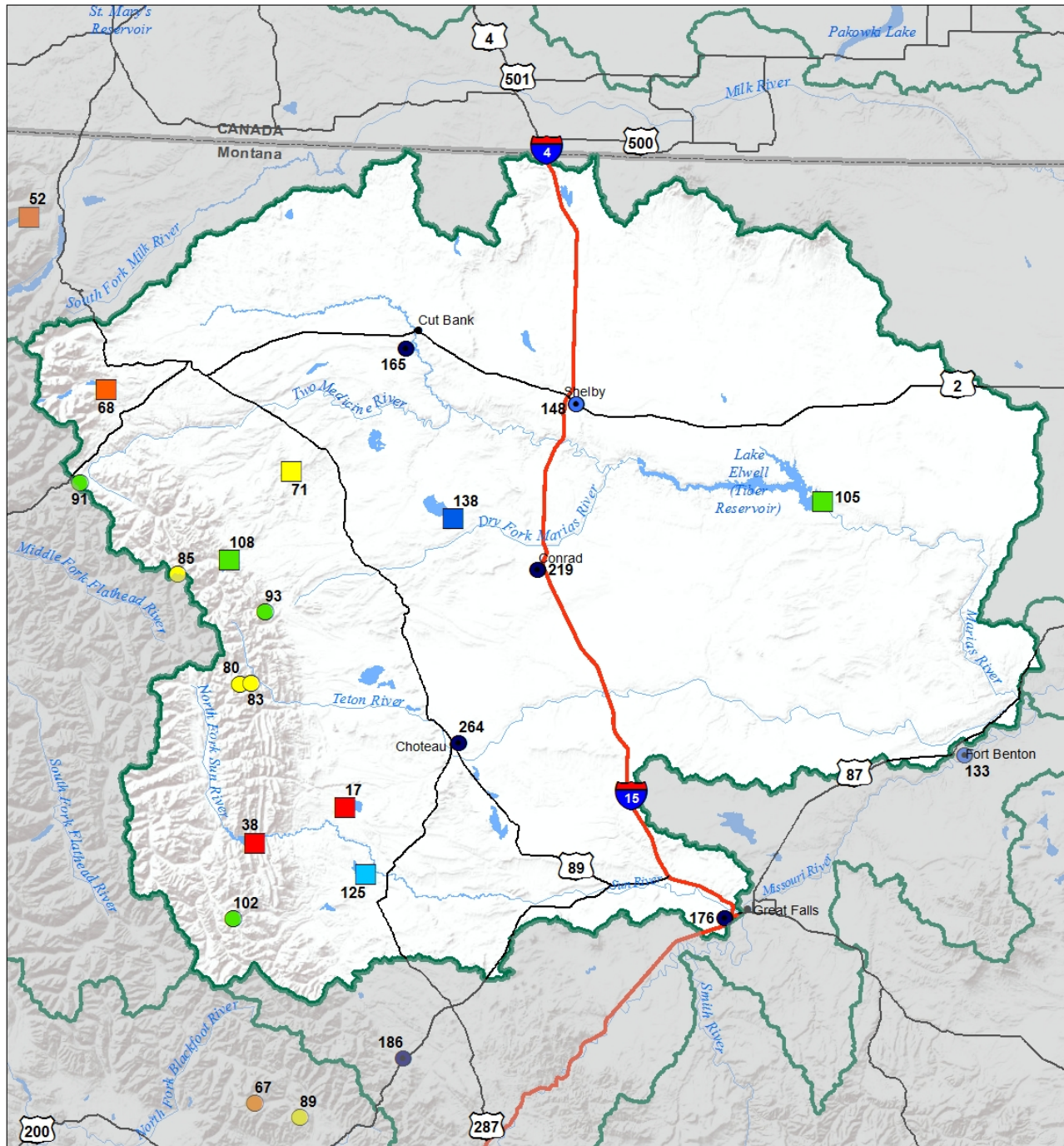
Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

**Sun-Teton-Marias River Basin  
Streamflow Forecast, Snow Water Equivalent  
Percentage of Normal  
March 1, 2019**





**Sun-Teton-Marias River Basin**  
**Water Year to Date Precipitation and Reservoir Levels**  
**Percentage of Normal**  
**March 1, 2019**



**Precipitation**  
**Percent of Normal**

**SNOTEL**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

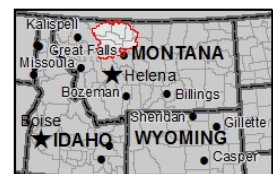
- 71 - 90%
- 51 - 70%
- 1 - 50%

**COOP/ACIS**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%

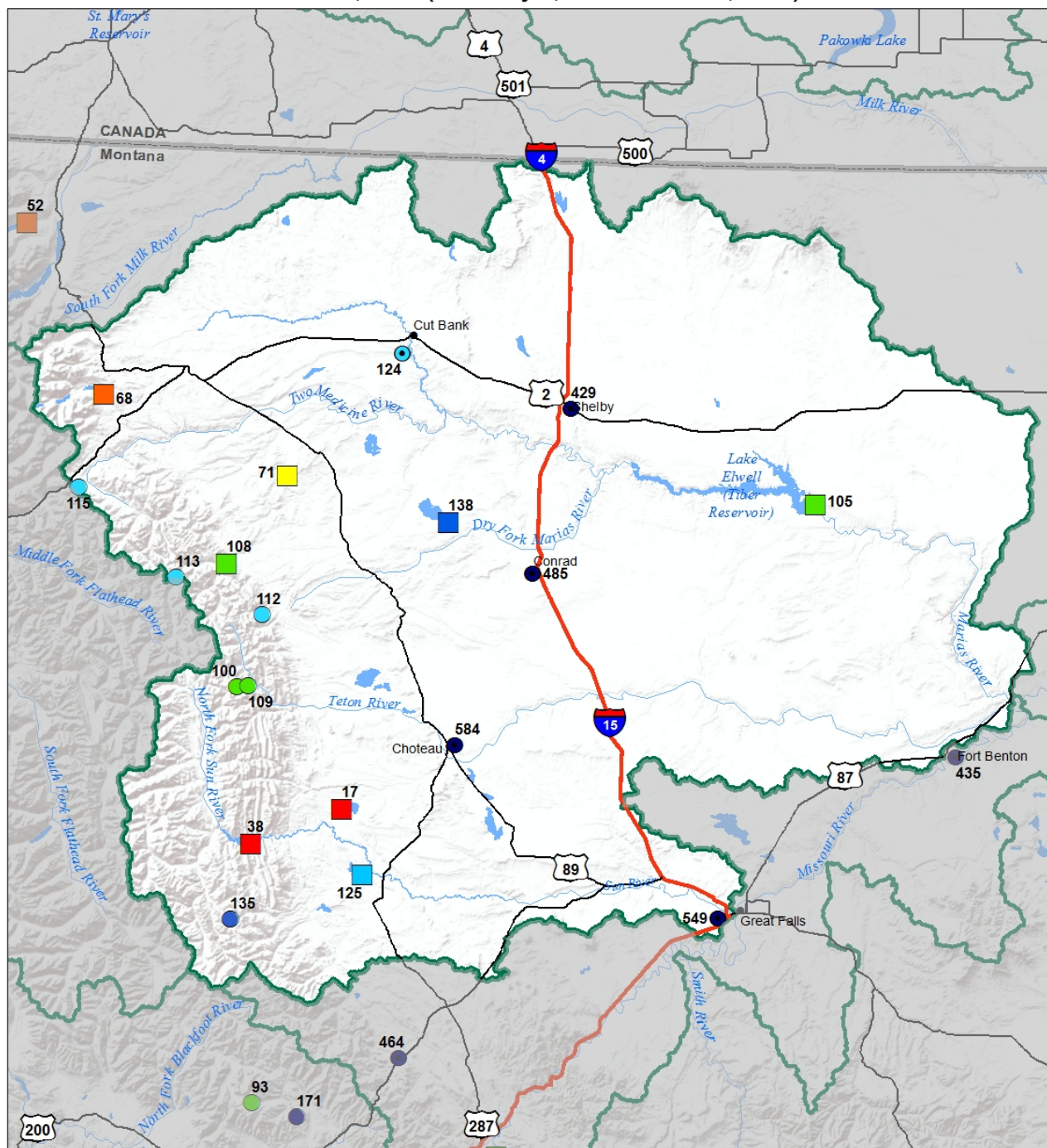
**Reservoirs**  
**Percent of Normal**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%





**Sun-Teton-Marias River Basin**  
**Monthly Precipitation and Reservoir Levels**  
**Percentage of Normal**  
**March 1, 2019 (February 1, 2019 - March 1, 2019)**



**Precipitation  
Percent of Normal**

**SNOTEL**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

**COOP/ACIS**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

**Reservoirs  
Percent of Normal**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%





## St. Mary-Milk River Basin



Snowfall in Glacier National Park wasn't as abundant as other parts of the state during the month of February, but it was enough to raise the basin percentages from February 1<sup>st</sup>. Both the Many Glacier and Flattop Mountain SNOTEL sites improved to slightly below normal (~90%) for March 1<sup>st</sup>. Further east in the Milk River basin, precipitation was above average for the month of February at valley locations, and the Rocky Boy SNOTEL site in the Bearpaw Mountains reported 187% of normal precipitation for the month.

### St. Mary-Milk River Basin Data Summary

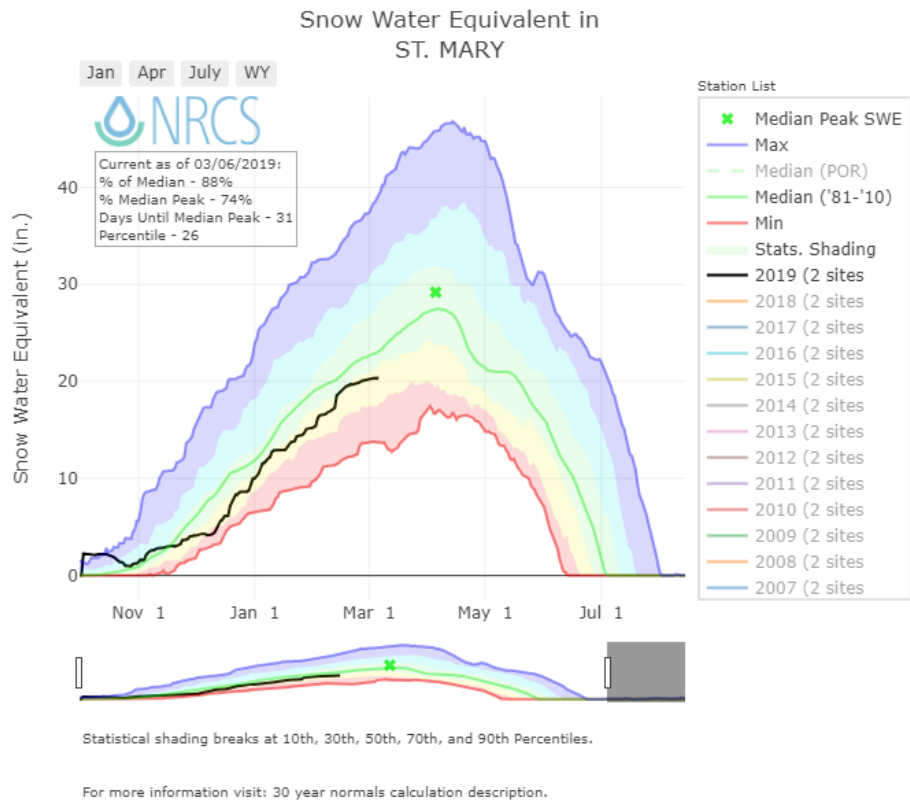
<b>Snowpack</b>	<b>Percent of 1981-2010 Normal (Median)</b>	<b>Last Year Percentage of Normal (Median)</b>
ST. MARY	91%	135%
BEARPAW MOUNTAINS	170%	153%
CYPRESS HILLS, CANADA	%	%
MILK RIVER BASIN	170%	153%
<b>Basin-Wide</b>	<b>97%</b>	<b>137%</b>

<b>Precipitation</b>	<b>Monthly Percentage of Average</b>	<b>WYTD Percentage of 1981-2010 Average*</b>	<b>WYTD Last Year Percentage of Average</b>
Mountain Precipitation (St. Mary)	102%	84%	127%
Mountain Precipitation (Bearpaw Mtns)	192%	154%	181%
Valley Precipitation	306%	122%	145%
<b>Basin-Wide Precipitation</b>	<b>126%</b>	<b>94%</b>	<b>134%</b>

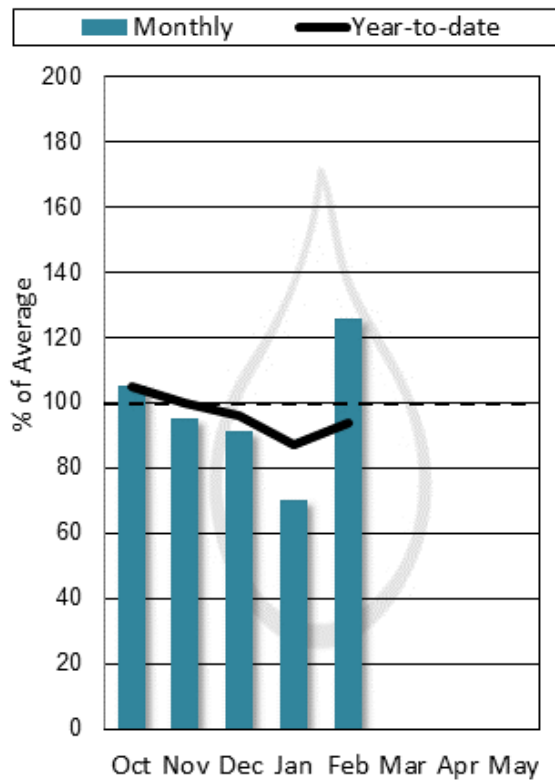
\*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

<b>Reservoir Storage</b>	<b>Percentage of Average</b>	<b>Percentage of Capacity (Total)</b>	<b>Last Year Percentage of Average</b>
<b>Basin-Wide Storage</b>	<b>98%</b>	<b>39%</b>	<b>91%</b>

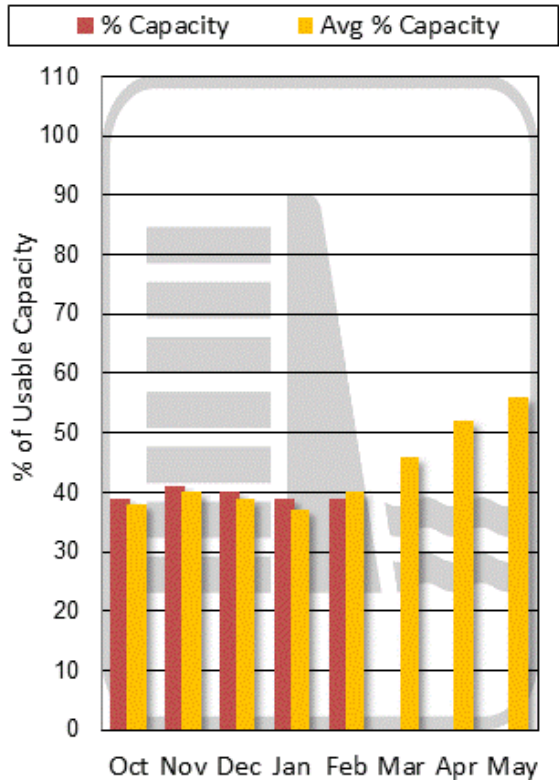
(click on chart below to navigate to [online version](#) with additional features)



### Mountain and Valley Precipitation



### End of Month Reservoir Storage



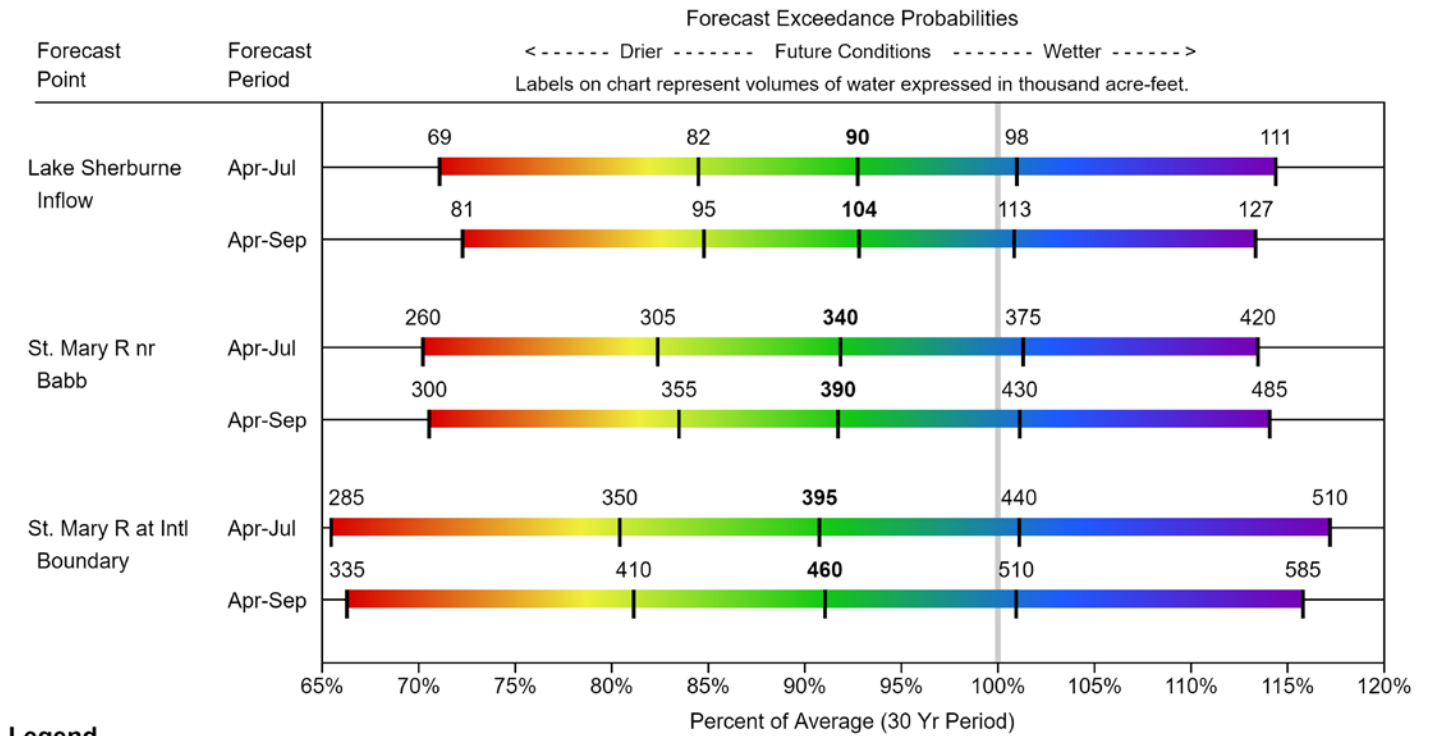
Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.



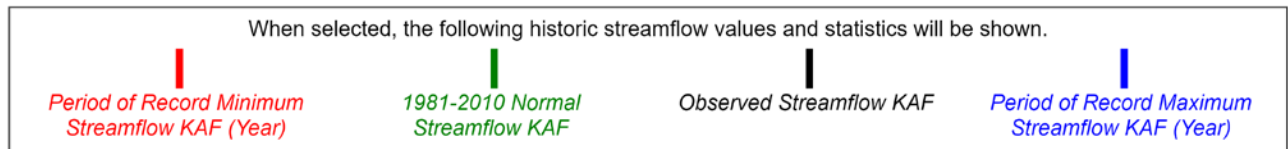
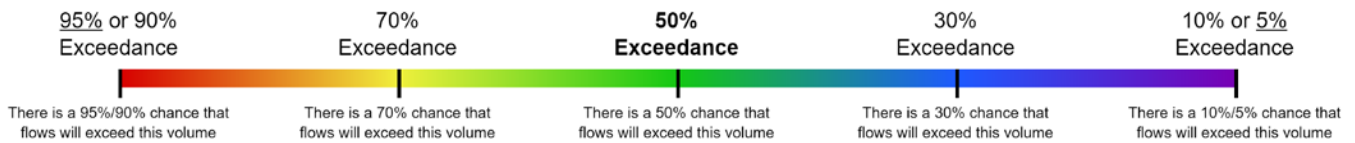
# ST. MARY & MILK BASINS

## Water Supply Forecasts

### March 1, 2019

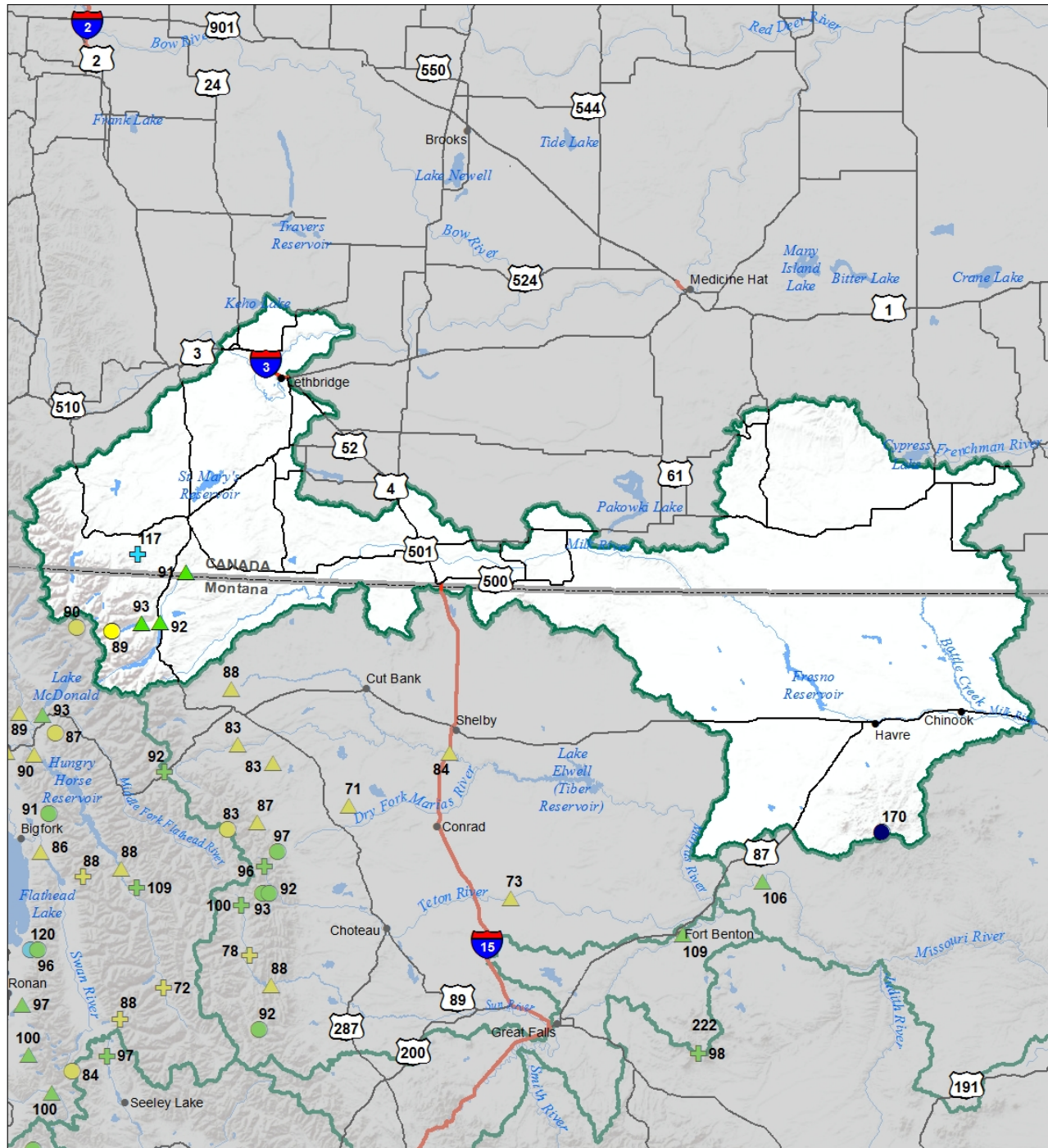


## Legend



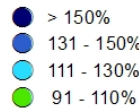
Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

**St Mary's-Milk River Basin  
Streamflow Forecast, Snow Water Equivalent  
Percentage of Normal  
March 1, 2019**

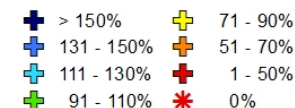


**Snow Water Equivalent  
Percent of Normal**

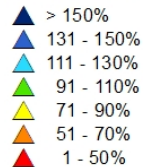
**SNOTEL**



**Snowcourse**

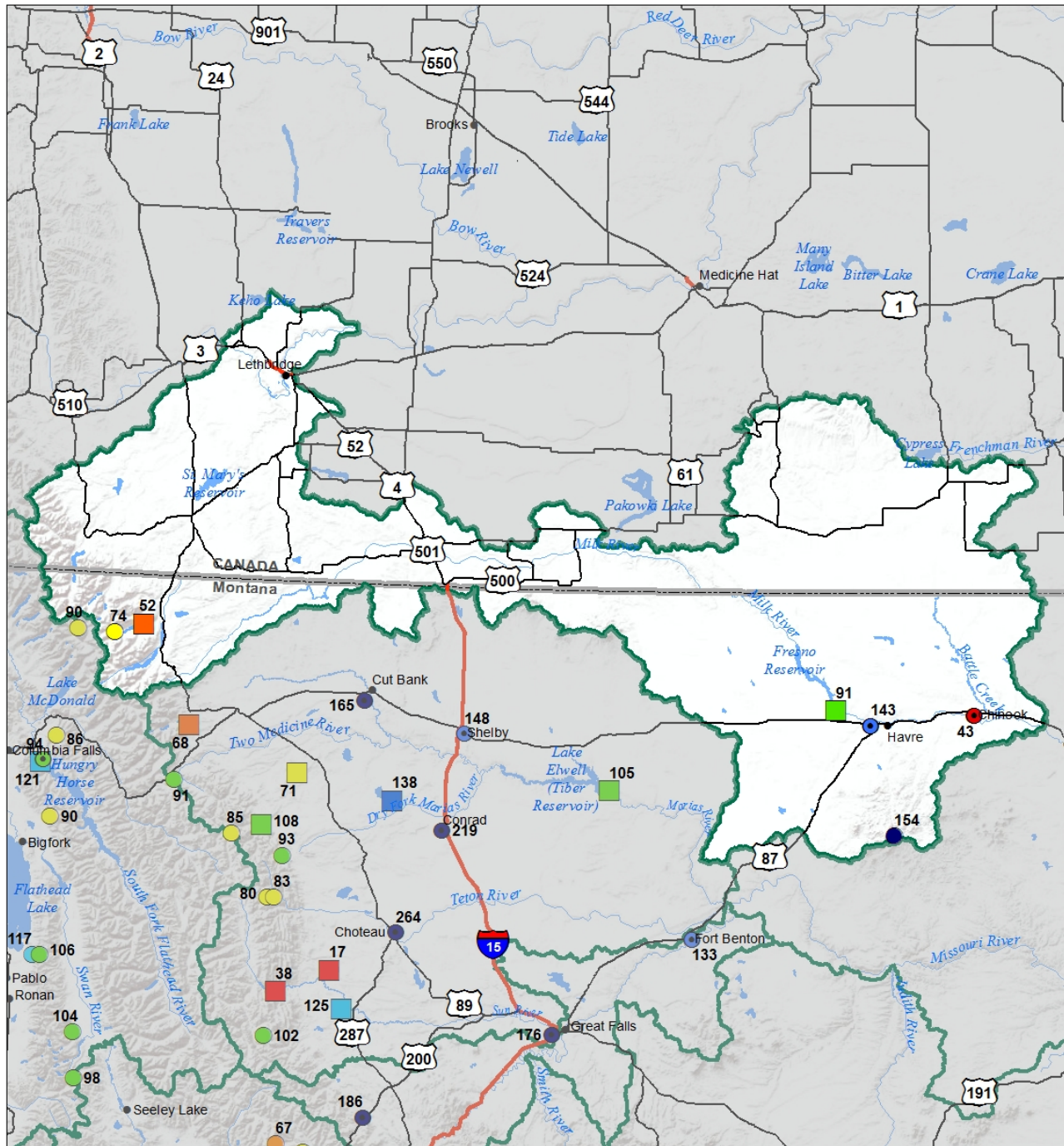


**Streamflow Forecast  
Percent of Average Flows**





**St Mary's-Milk River Basin**  
**Water Year to Date Precipitation and Reservoir Levels**  
**Percentage of Normal**  
**March 1, 2019**



**Precipitation  
Percent of Normal**

**SNOTEL**

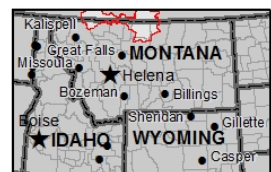
- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

**COOP/ACIS**

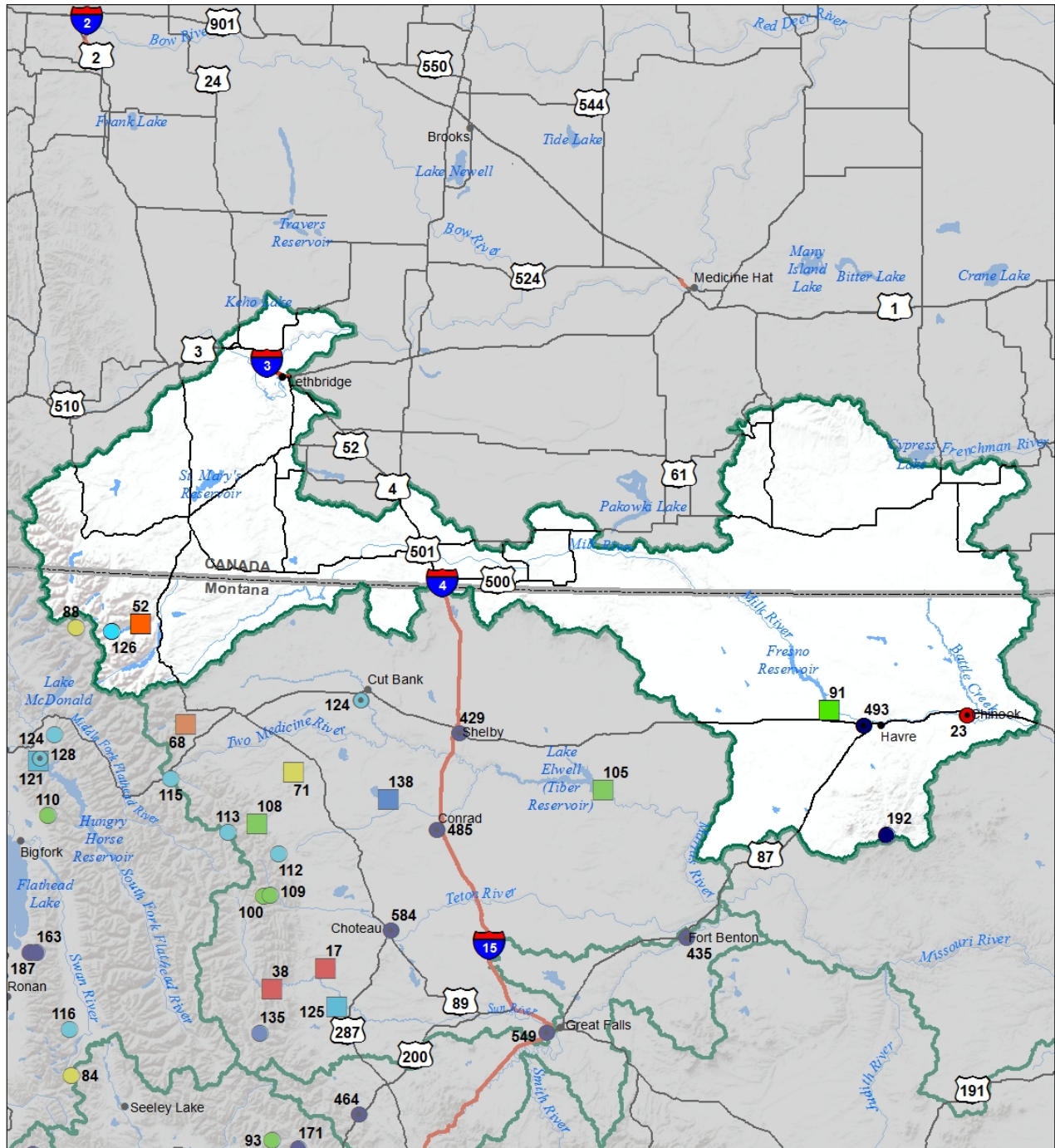
- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

**Reservoirs  
Percent of Normal**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%



**St Mary's-Milk River Basin**  
**Monthly Precipitation and Reservoir Levels**  
**Percentage of Normal**  
**March 1, 2019 (February 1, 2019 - March 1, 2019)**



**Precipitation**  
**Percent of Normal**

**SNOTEL**

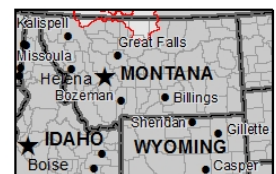
- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

**COOP/ACIS**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%

**Reservoirs**  
**Percent of Normal**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%







## Upper Yellowstone River Basin

Sometimes, you just have to eat crow. The January report pointed out that the snowpack in certain regions of the Upper Yellowstone River basin was well below normal and it would take a major (and unlikely) pattern shift for things to turn around. Well, that's what happened. Snowfall across the Upper Yellowstone River basin was [well above normal to record breaking](#) for the month of February. The snowpack in the southern half of the basin in Yellowstone has improved from well below normal on February 1<sup>st</sup>, to near to above normal on March 1<sup>st</sup>, receiving 170% to >300% of normal during the month. Northern basins also experienced a snowier than normal month and the two SNOTEL sites in the Crazy Mountains experienced their [largest increase in snow water equivalent](#) on record for the month of February. Snow totals for the month were impressive and resulted in March 1<sup>st</sup> streamflow forecasts that are near to above average across the basin for the April 1<sup>st</sup> – July 31<sup>st</sup> period. Looking forward, the critical March – May months are still to come, and snowpack in the high elevation mountains that feed the Yellowstone typically peaks in mid to late April. These months are generally some of the “biggest” with regards to snowfall and precipitation across the basin, so below normal in the future could certainly impact us as we approach runoff. For now, the mountains are in good shape and if the more favorable weather patterns experienced during February persist, streamflow should be adequate for everyone's needs this spring and summer.

### Upper Yellowstone River Basin Data Summary

#### Snowpack

	Percent of 1981-2010 Normal (Median)	Last Year Percentage of Normal (Median)
YELLOWSTONE ab LIVINGSTON	116%	156%
SHIELDS	137%	164%
BOULDER-STILLWATER	121%	182%
RED LODGE-ROCK CREEK	148%	130%
CLARK'S FORK	112%	186%
<b>Basin-Wide Snowpack</b>	<b>121%</b>	<b>163%</b>

#### Precipitation

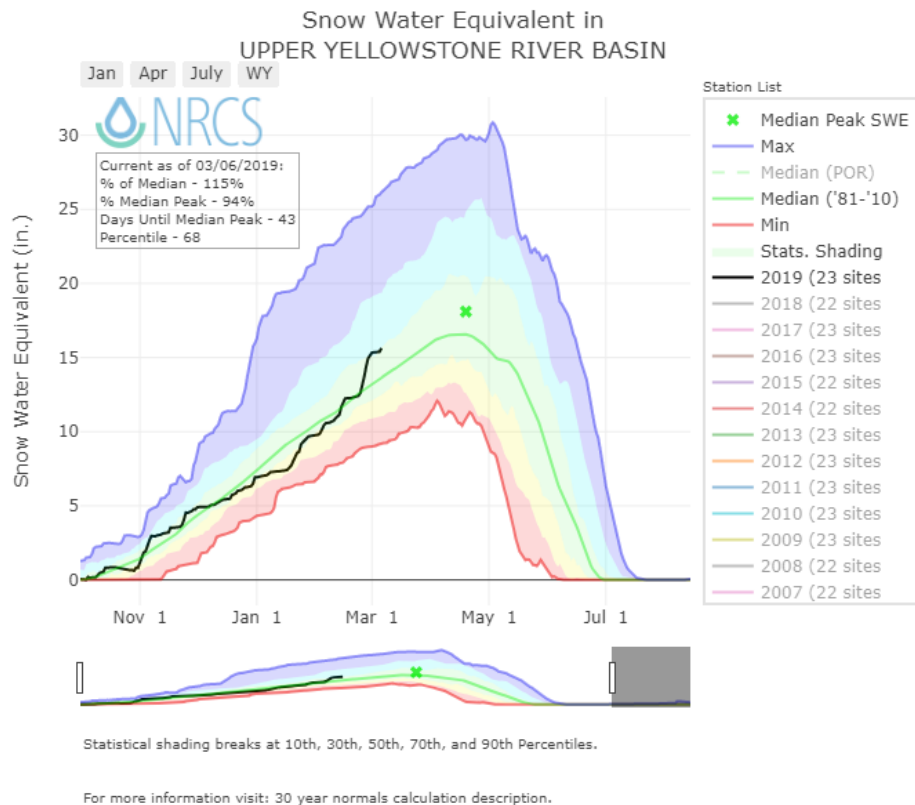
	Monthly Percentage of Average	WYTD Percentage of 1981-2010 Average*	WYTD Last Year Percentage of Average
Mountain Precipitation	195%	117%	144%
Valley Precipitation	351%	141%	186%
<b>Basin-Wide Precipitation</b>	<b>205%</b>	<b>119%</b>	<b>147%</b>

\*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

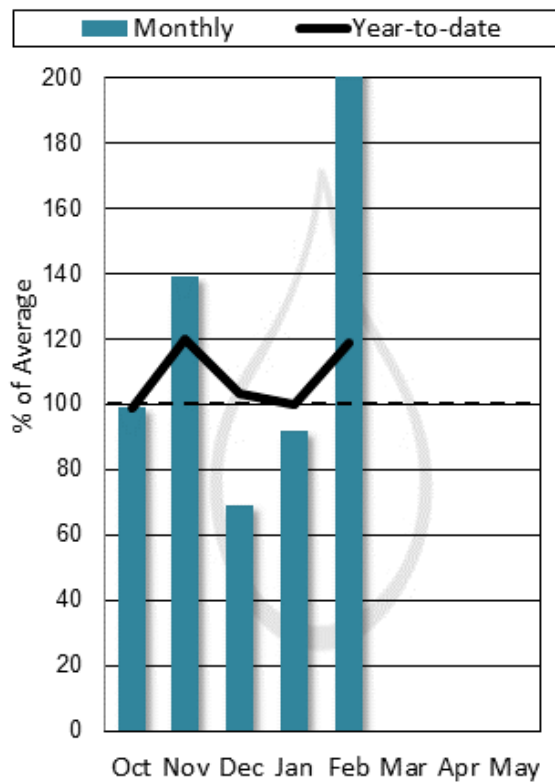
#### Reservoir Storage

	Percentage of Average	Percentage of Capacity (Total)	Last Year Percentage of Average
<b>Basin-Wide Storage</b>	<b>121%</b>	<b>52%</b>	<b>119%</b>

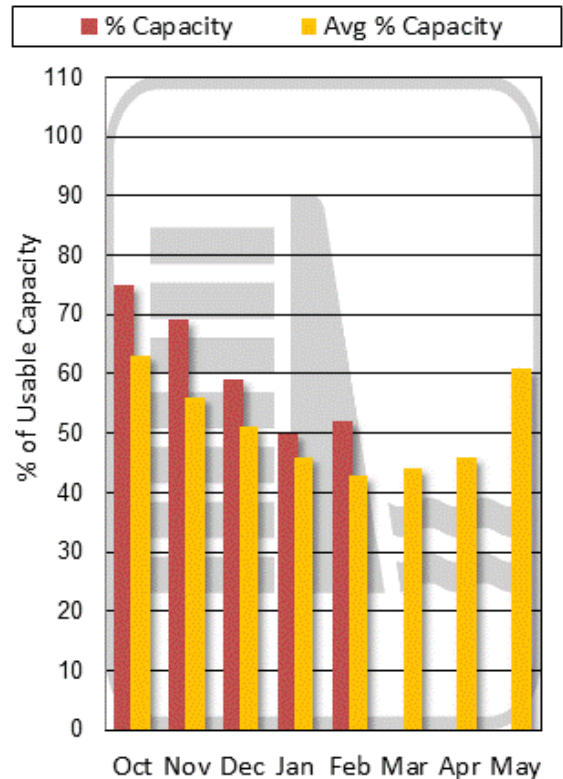
(click on chart below to navigate to [online version](#) with additional features)



### Mountain and Valley Precipitation



### End of Month Reservoir Storage



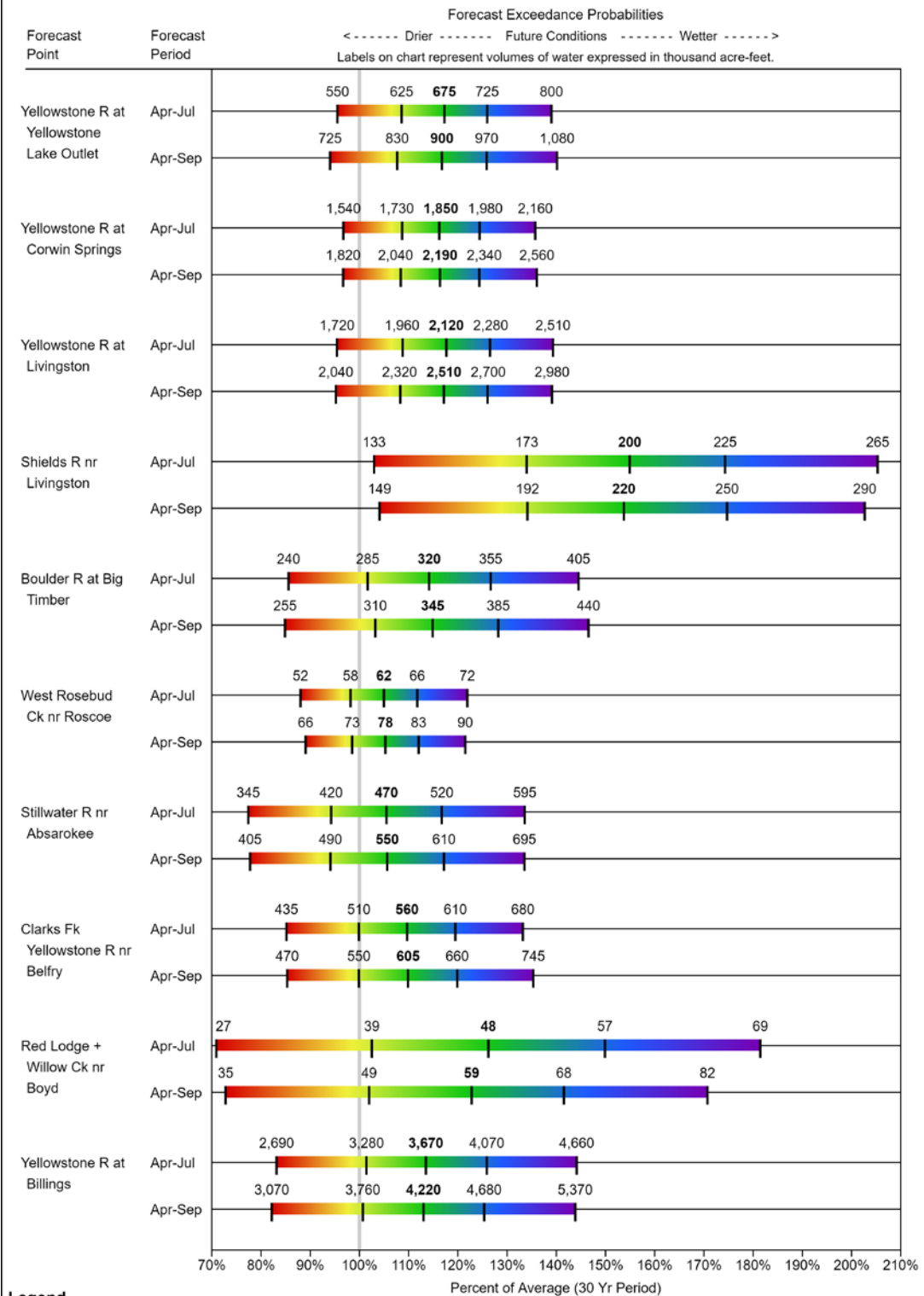
Storage above is averaged for all reservoirs in the basin. For individual reservoirs see table below.



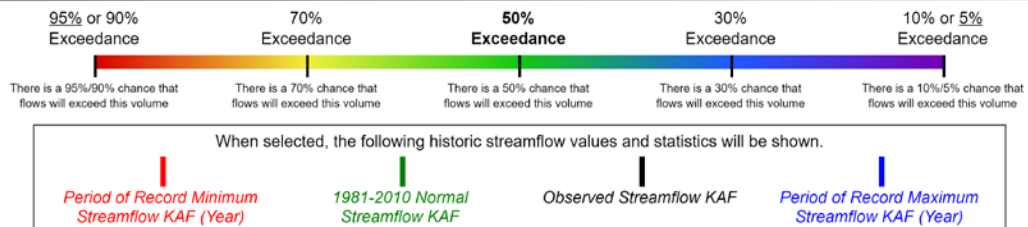
# UPPER YELLOWSTONE RIVER BASIN

## Water Supply Forecasts

March 1, 2019

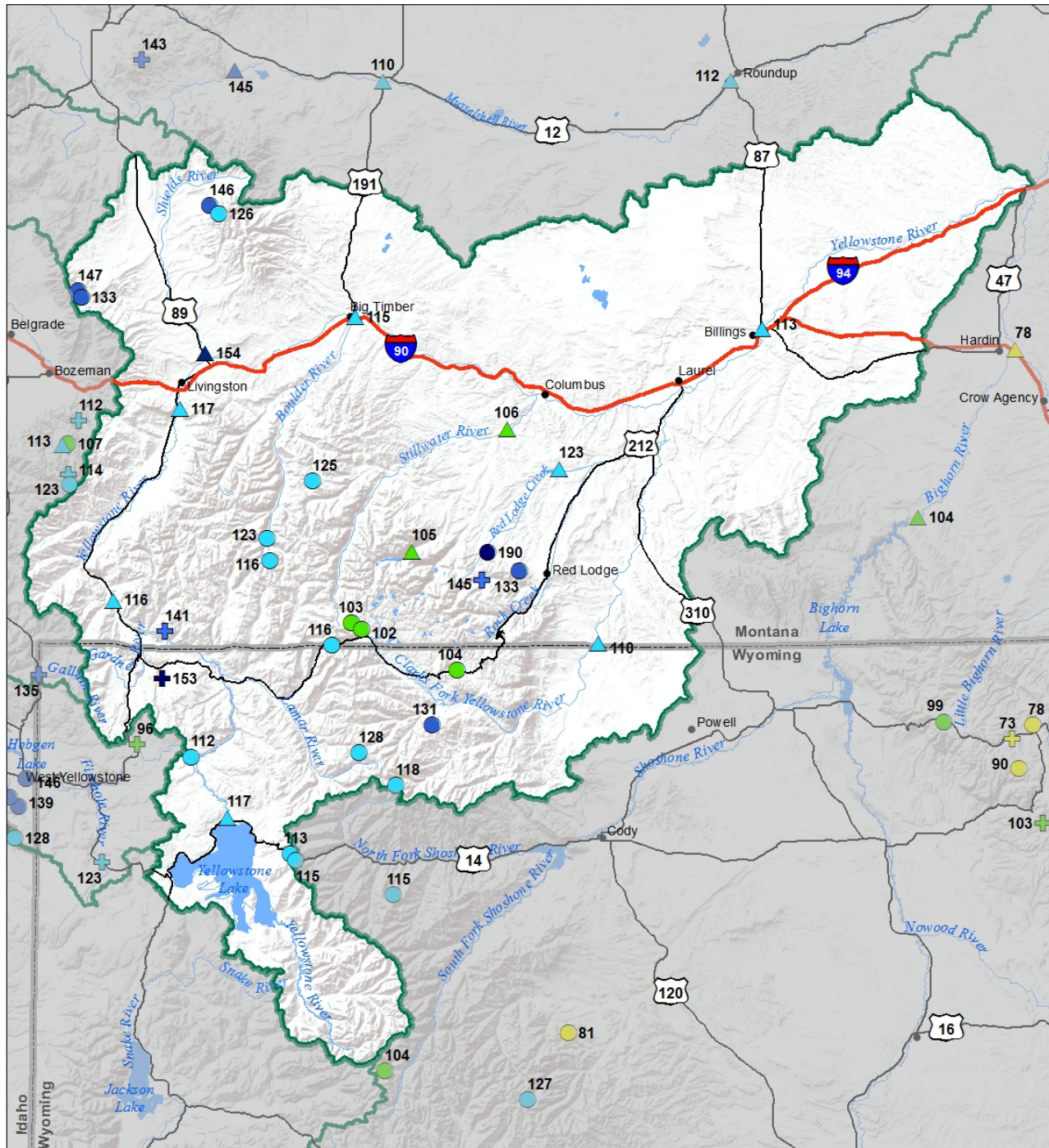


### Legend



Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

**Upper Yellowstone River Basin  
Streamflow Forecast, Snow Water Equivalent  
Percentage of Normal  
March 1, 2019**



**Snow Water Equivalent  
Percent of Normal**

**SNOTEL**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%
- 0%

**Snowcourse**

- ✚ > 150%
- ✚ 131 - 150%
- ✚ 111 - 130%
- ✚ 91 - 110%
- ✚ 71 - 90%
- ✚ 51 - 70%
- ✚ 1 - 50%
- ✚ 0%

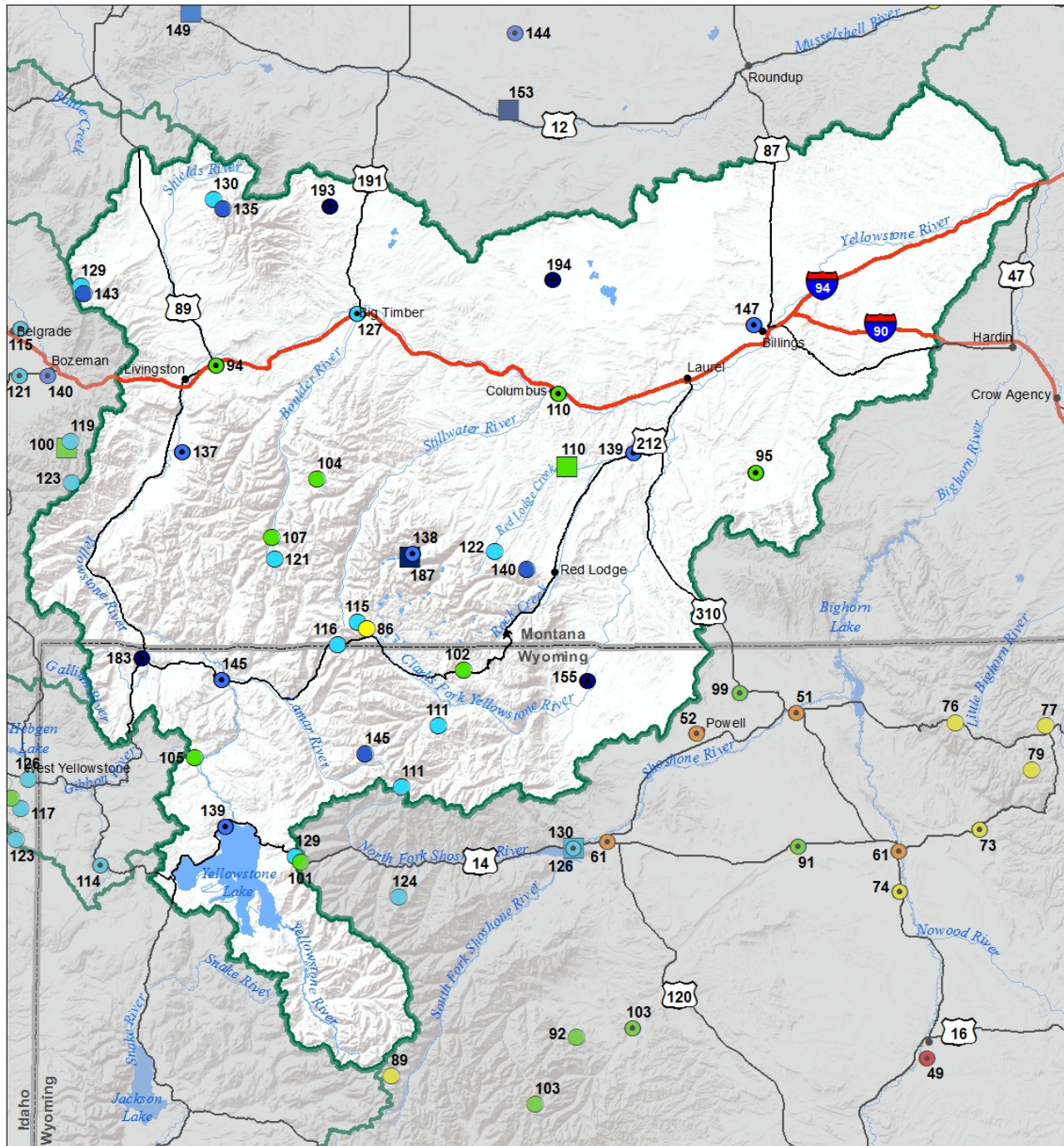
**Streamflow Forecast  
Percent of Average Flows**

- ▲ > 150%
- ▲ 131 - 150%
- ▲ 111 - 130%
- ▲ 91 - 110%
- ▲ 71 - 90%
- ▲ 51 - 70%
- ▲ 1 - 50%

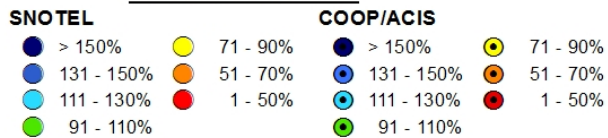




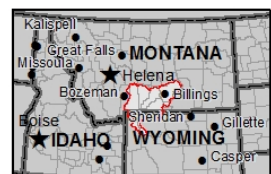
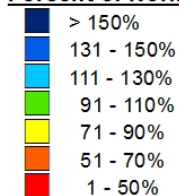
**Upper Yellowstone River Basin  
Water Year to Date Precipitation and Reservoir Levels  
Percentage of Normal  
March 1, 2019**



**Precipitation  
Percent of Normal**

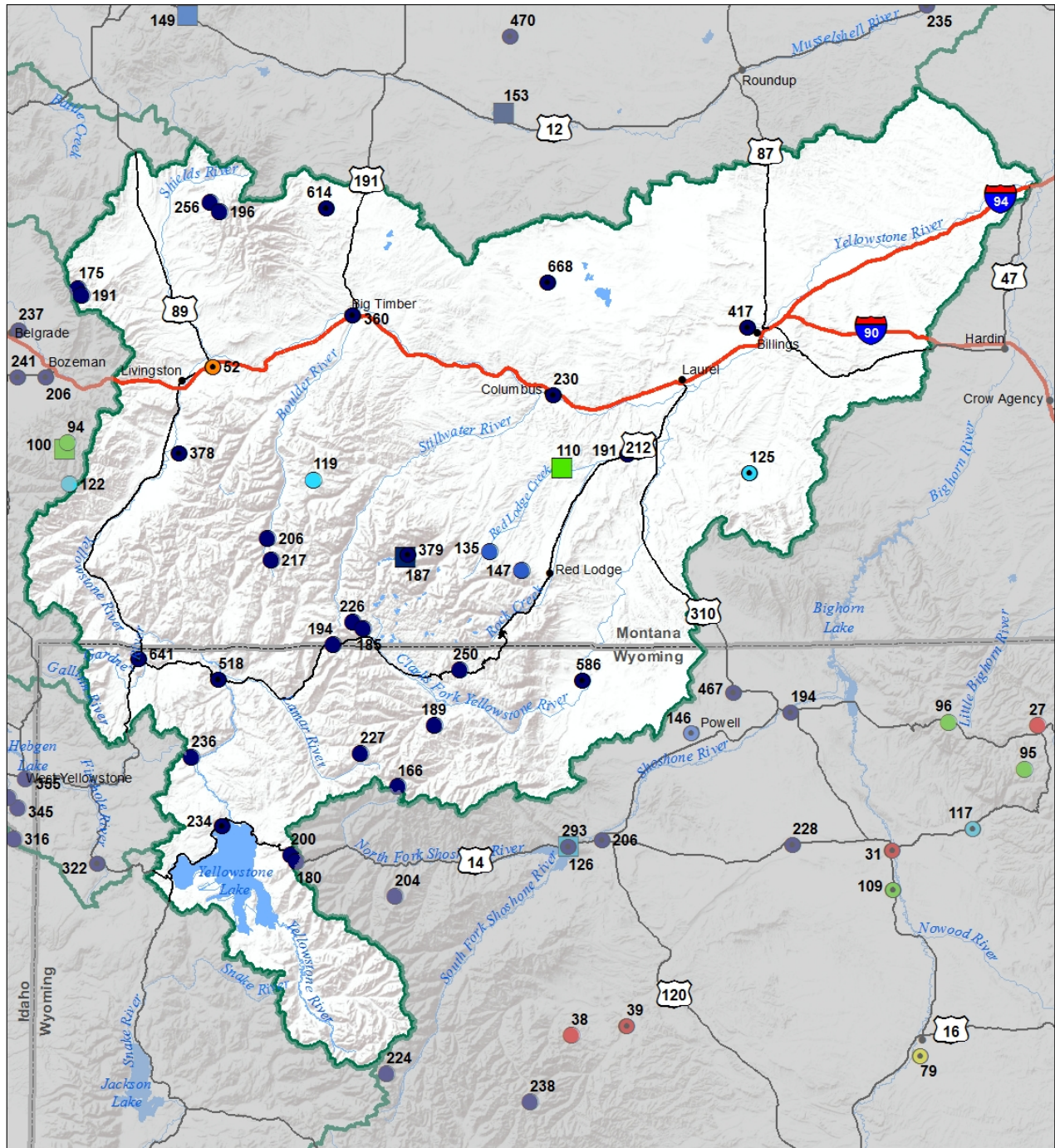


**Reservoirs  
Percent of Normal**

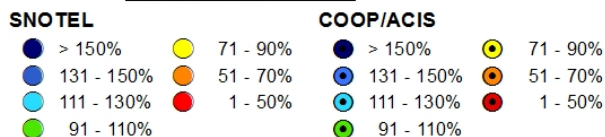




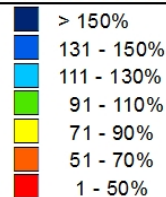
**Upper Yellowstone River Basin  
Monthly Precipitation and Reservoir Levels  
Percentage of Normal  
March 1, 2019 (February 1, 2019 - March 1, 2019)**



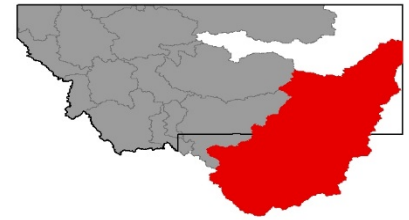
**Precipitation  
Percent of Normal**



**Reservoirs  
Percent of Normal**







## Lower Yellowstone River Basin

Storm patterns throughout February favored the western watersheds of the Lower Yellowstone basin. Snowpack percentages in the Shoshone and Wind River basins improved substantially this past month thanks to continuous snowfall throughout the month. The Deer Park SNOTEL site in the southern end of the Wind River Range received 5.9" of snow water equivalent (SWE) during February. This was the 2<sup>nd</sup> highest February SWE total recorded at this site in its 21 years of observations. Unfortunately, the story was not so snowy for the Big Horn Mountains this month. Snowpack percentages for the Tongue and Powder River basins have declined from last month. These basins did not receive much new snow in February. In fact, 2 SNOTEL sites in the Tongue (Burgess Junction and Big Goose) recorded record low SWE totals for the month. For Burgess Junction this was the lowest February SWE total in its 38 years history! The low snowpack totals are influencing the streamflow forecasts for this spring, with all forecasts for the Tongue and Powder Rivers calling for below normal runoff. Luckily, these basins typically receive the bulk of their snowpack between March 1 and April 15<sup>th</sup> so there is still ample time to recover and a good chance for streamflow forecasts to improve.

### Lower Yellowstone River Basin Data Summary

#### Snowpack

	Percent of 1981-2010 Normal (Median)	Last Year Percentage of Normal (Median)
WIND RIVER BASIN	111%	118%
SHOSHONE RIVER BASIN	115%	157%
BIGHORN RIVER BASIN	106%	147%
LITTLE BIGHORN BASIN	86%	109%
TONGUE RIVER BASIN	85%	114%
POWDER RIVER BASIN	95%	131%
<b>Basin-Wide Snowpack</b>	<b>102%</b>	<b>127%</b>

#### Precipitation

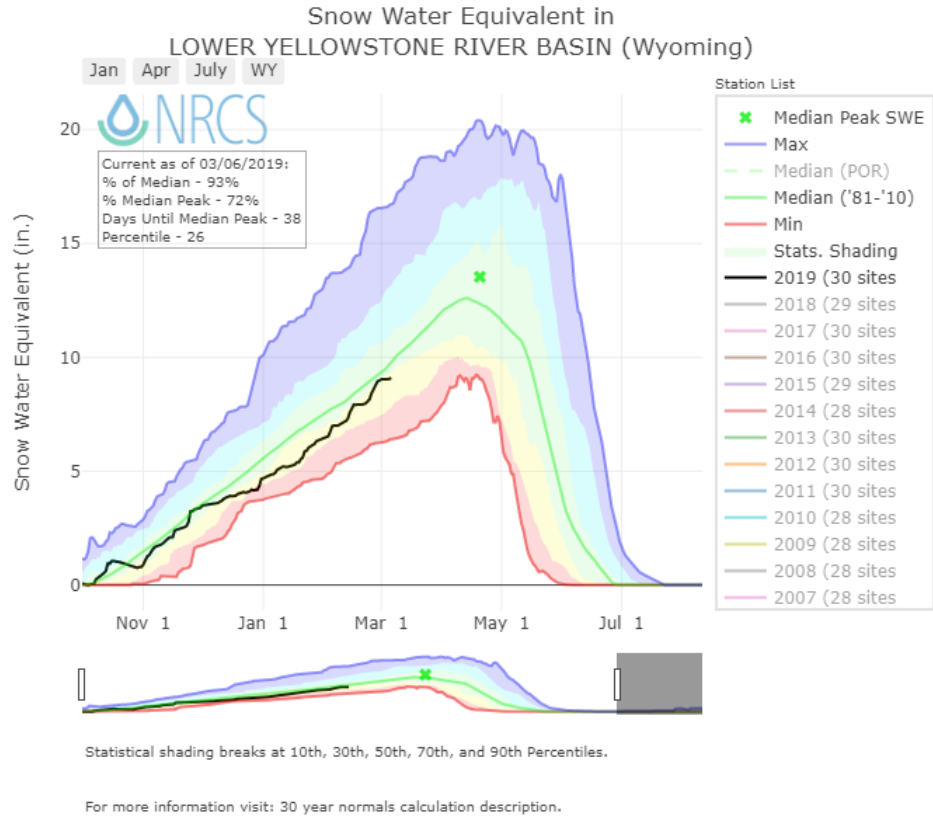
	Monthly Percentage of Average	WYTD Percentage of 1981- 2010 Average*	WYTD Last Year Percentage of Average
Mountain Precipitation	124%	94%	109%
Valley Precipitation	176%	116%	120%
<b>Basin-Wide Precipitation</b>	<b>138%</b>	<b>101%</b>	<b>112%</b>

\*Water Year-to-Date (WYTD) Precipitation is October 1st - Current

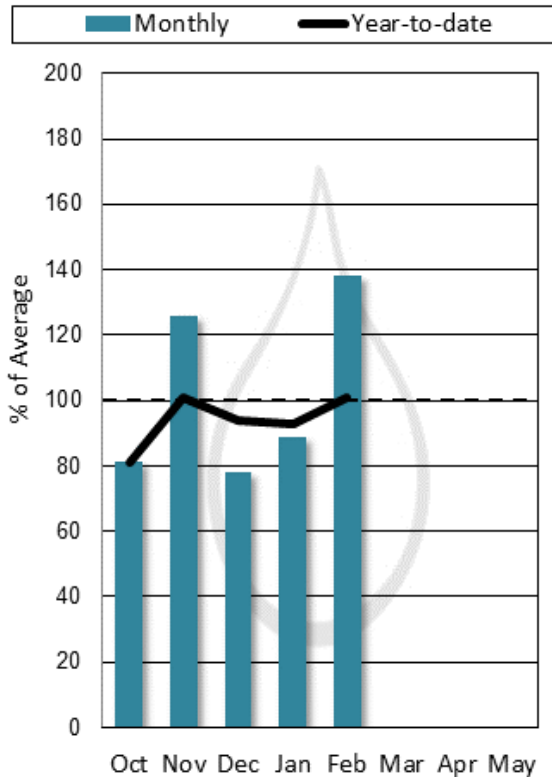
#### Reservoir Storage

	Percentage of Average	Percentage of Capacity (Total)	Last Year Percentage of Average
<b>Basin-Wide Storage</b>	<b>101%</b>	<b>58%</b>	<b>101%</b>

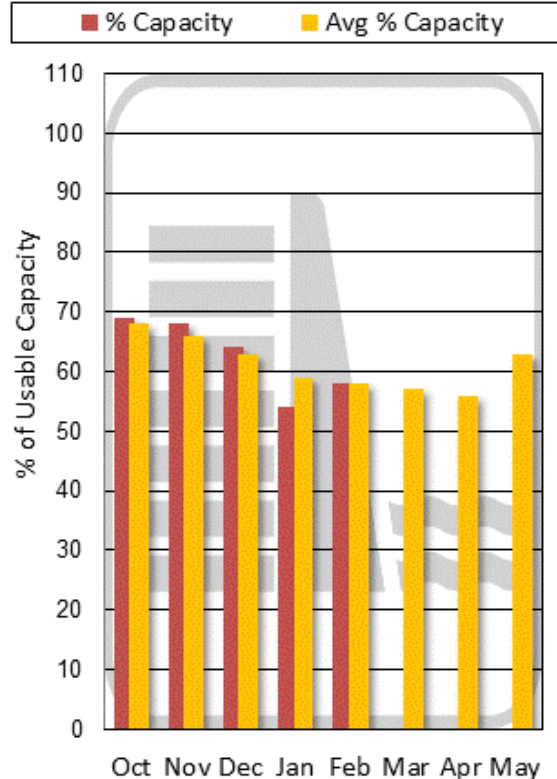
(click on chart below to navigate to online version with additional features)



### Mountain and Valley Precipitation



### End of Month Reservoir Storage

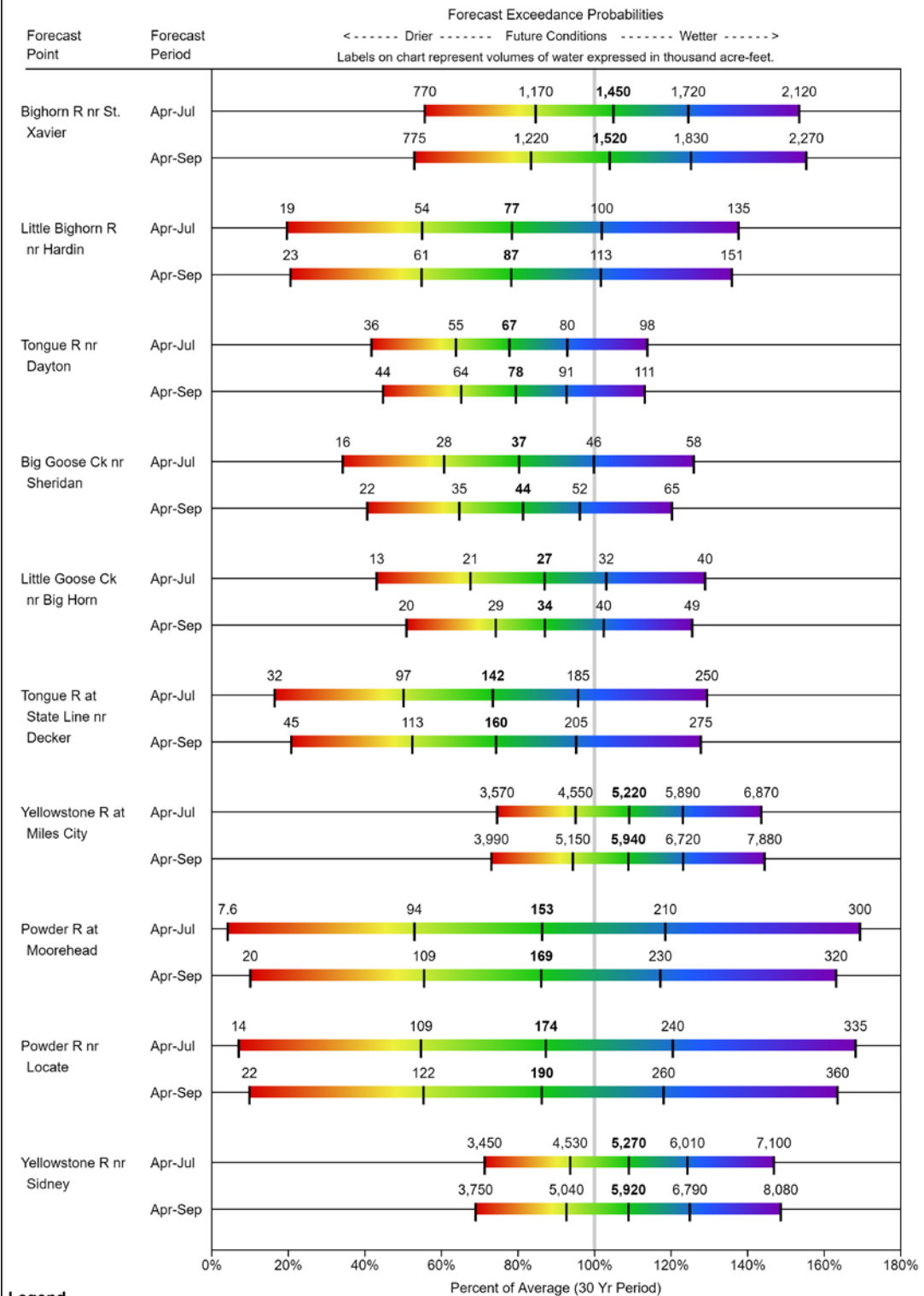




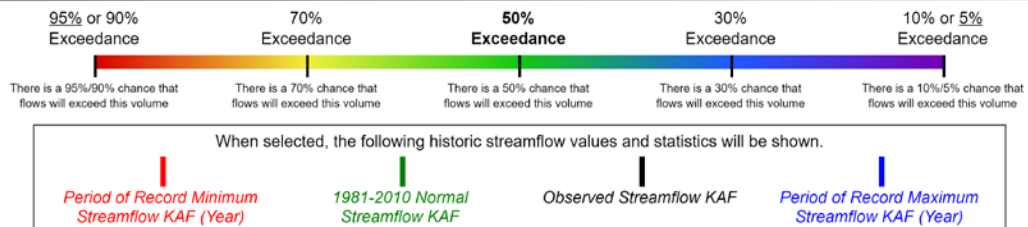
# LOWER YELLOWSTONE RIVER BASIN (Wyoming)

## Water Supply Forecasts

March 1, 2019

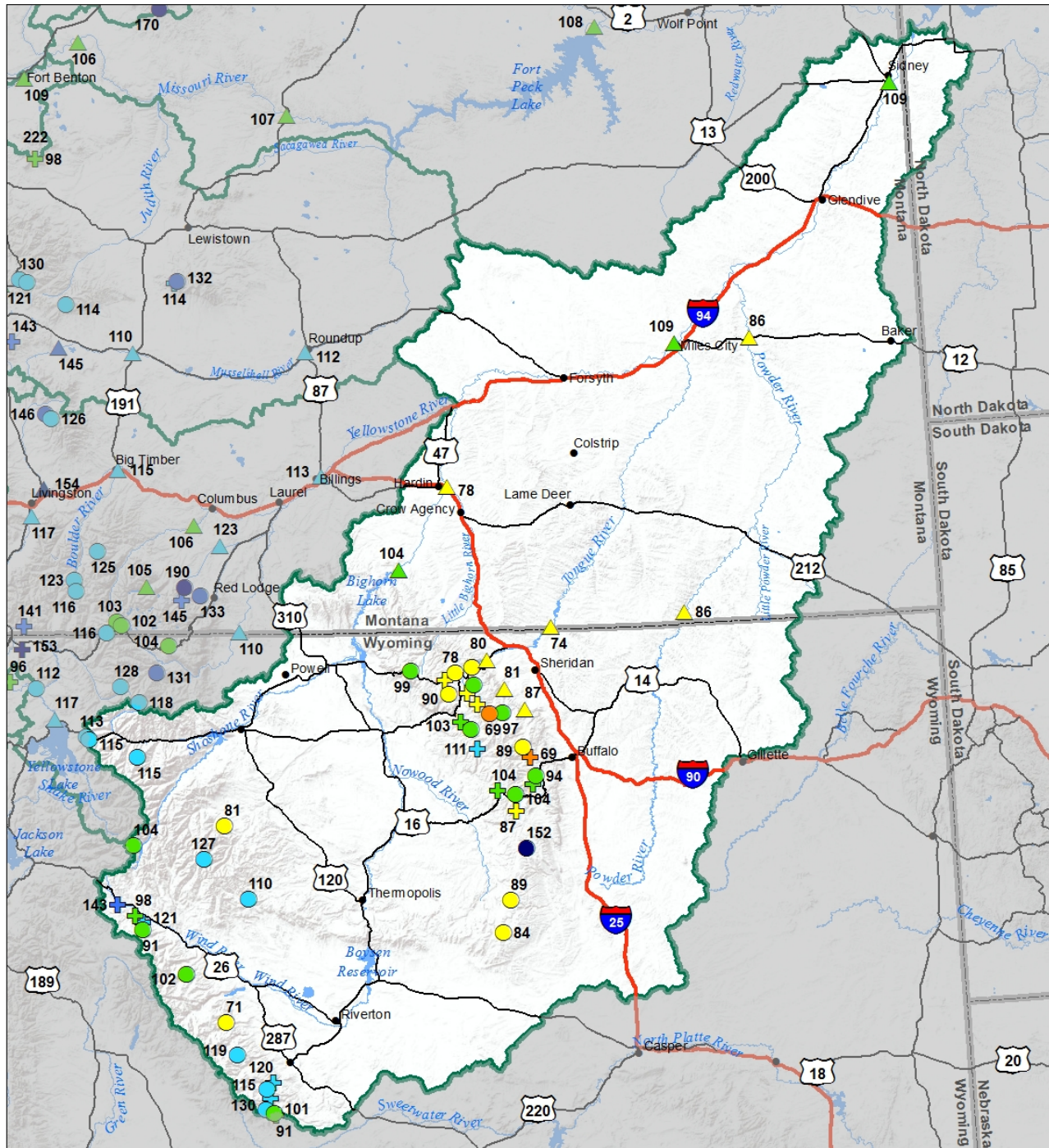


### Legend



Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

**Lower Yellowstone River Basin  
Streamflow Forecast, Snow Water Equivalent  
Percentage of Normal  
March 1, 2019**



**Snow Water Equivalent  
Percent of Normal**

**SNOTEL**

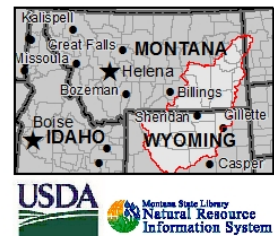
- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%
- \*

**Snowcourse**

- > 150%
- 131 - 150%
- 111 - 130%
- 91 - 110%
- 71 - 90%
- 51 - 70%
- 1 - 50%
- \*

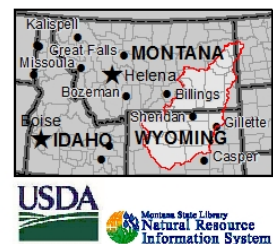
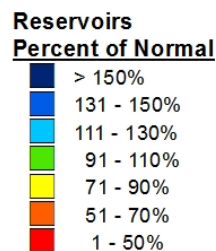
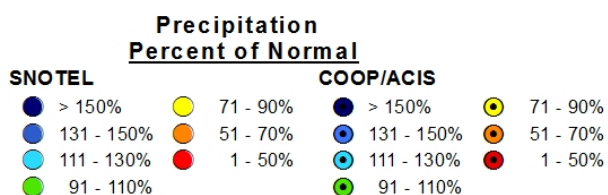
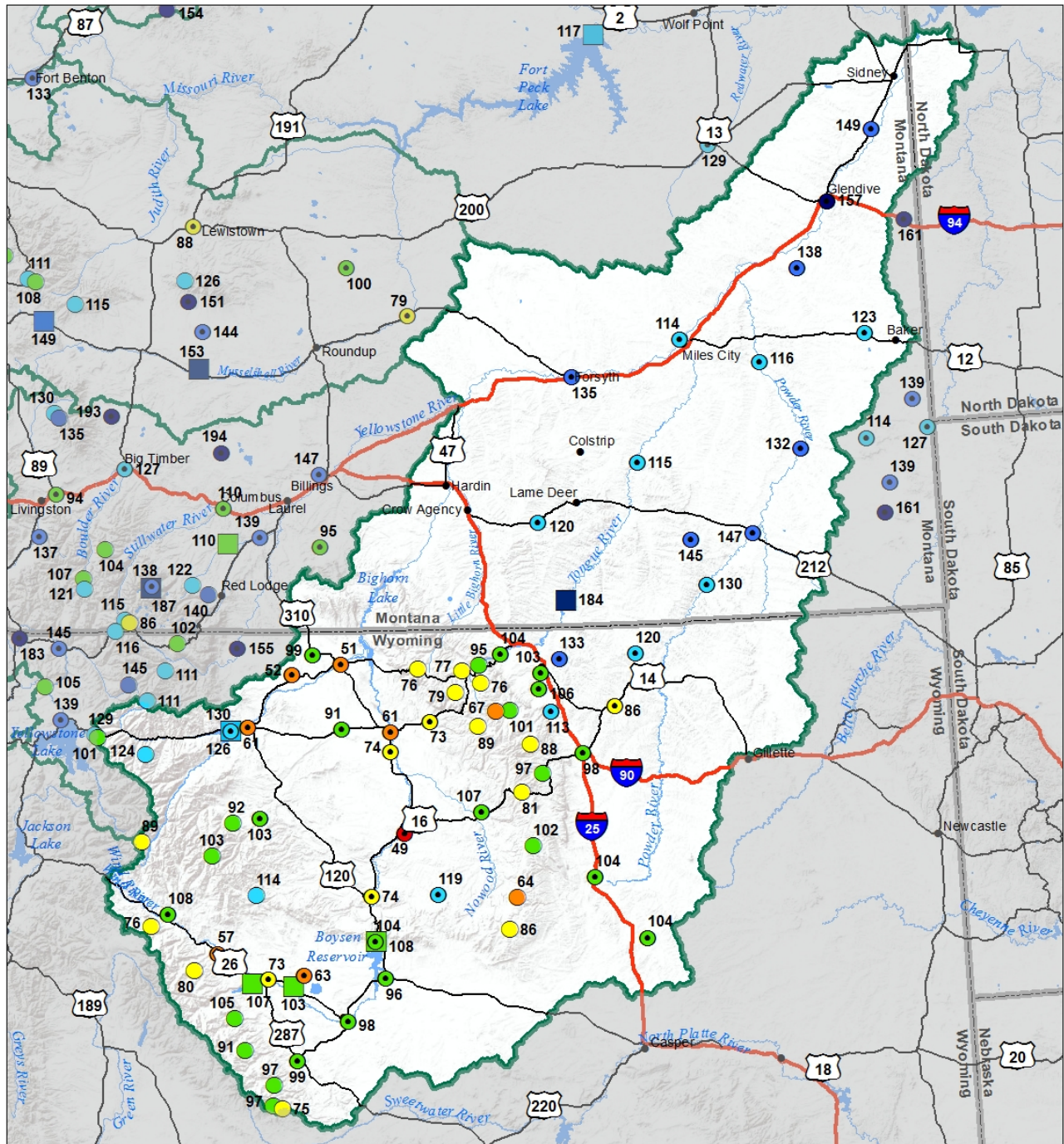
**Streamflow Forecast  
Percent of Average Flows**

- ▲ > 150%
- ▲ 131 - 150%
- ▲ 111 - 130%
- ▲ 91 - 110%
- ▲ 71 - 90%
- ▲ 51 - 70%
- ▲ 1 - 50%



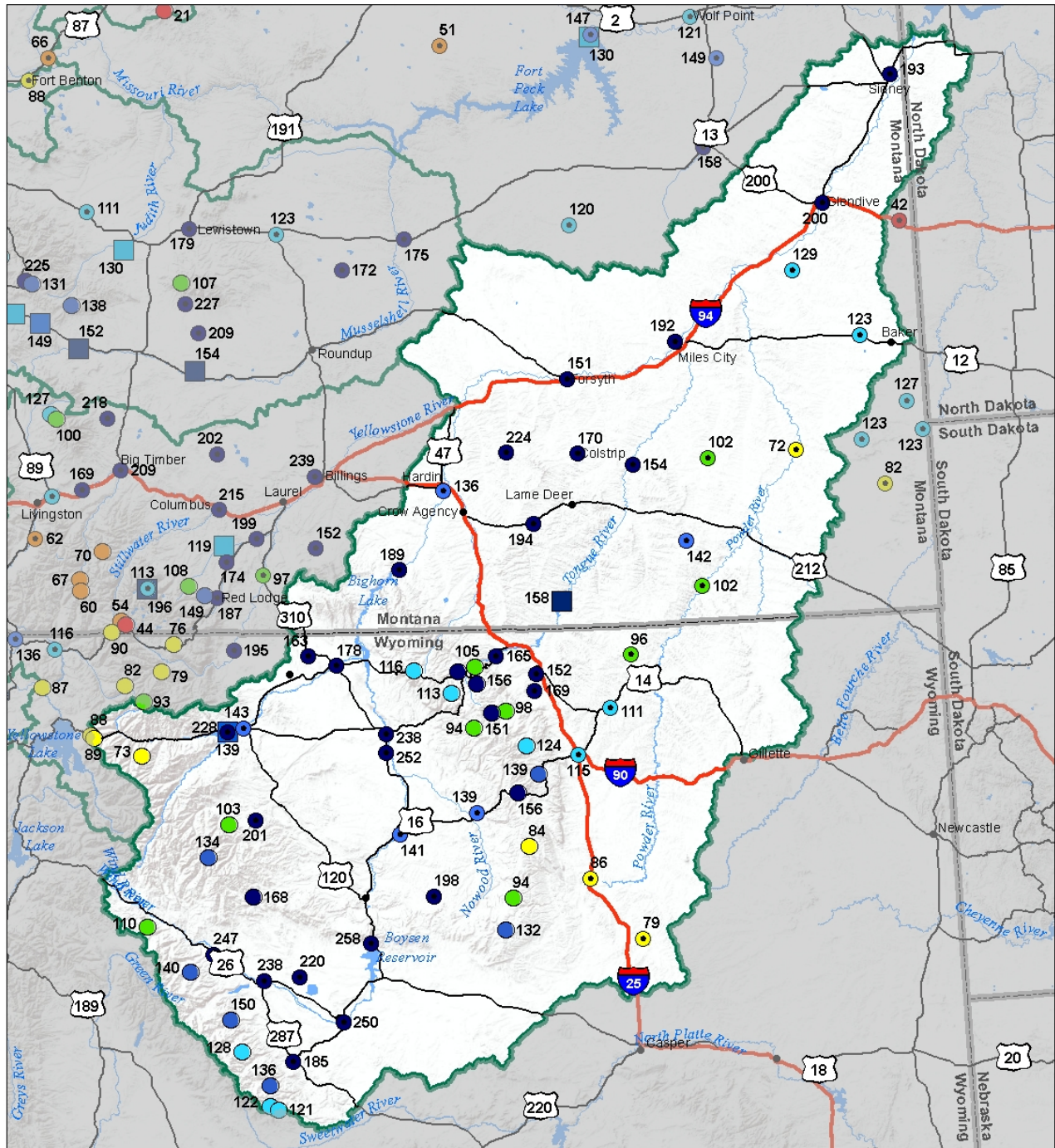


**Lower Yellowstone River Basin  
Water Year to Date Precipitation and Reservoir Levels  
Percentage of Normal  
March 1, 2019**





**Lower Yellowstone River Basin  
Monthly Precipitation and Reservoir Levels  
Percentage of Normal  
June 1, 2018 (May 1, 2018 - June 1, 2018)**



**Precipitation  
Percent of Normal**

SNOTEL		COOP/ACIS	
<span style="color: blue;">●</span> > 150%	<span style="color: yellow;">●</span> 71 - 90%	<span style="color: blue;">●</span> > 150%	<span style="color: yellow;">●</span> 71 - 90%
<span style="color: lightblue;">●</span> 131 - 150%	<span style="color: orange;">●</span> 51 - 70%	<span style="color: lightblue;">●</span> 131 - 150%	<span style="color: orange;">●</span> 51 - 70%
<span style="color: cyan;">●</span> 111 - 130%	<span style="color: red;">●</span> 1 - 50%	<span style="color: cyan;">●</span> 111 - 130%	<span style="color: red;">●</span> 1 - 50%
<span style="color: green;">●</span> 91 - 110%		<span style="color: green;">●</span> 91 - 110%	

**Reservoirs  
Percent of Normal**

<span style="background-color: darkblue; width: 10px; height: 10px; display: inline-block;"></span> > 150%
<span style="background-color: blue; width: 10px; height: 10px; display: inline-block;"></span> 131 - 150%
<span style="background-color: lightblue; width: 10px; height: 10px; display: inline-block;"></span> 111 - 130%
<span style="background-color: cyan; width: 10px; height: 10px; display: inline-block;"></span> 91 - 110%
<span style="background-color: yellow; width: 10px; height: 10px; display: inline-block;"></span> 71 - 90%
<span style="background-color: orange; width: 10px; height: 10px; display: inline-block;"></span> 51 - 70%
<span style="background-color: red; width: 10px; height: 10px; display: inline-block;"></span> 1 - 50%





*Issued by:*

**Matt Lohr**  
**Chief**  
**Natural Resources Conservation Service**  
**U.S. Department of Agriculture**

*Released by:*

**Tom Watson**  
**State Conservationist**  
**Natural Resources Conservation Service**  
**Bozeman, Montana**

*Report Created by:*

**Montana Snow Survey Staff**  
**10 East Babcock St, Room 443**  
**Bozeman, MT 59715**  
**Email: MT-nrcs-snow@one.usda.gov**



# **Montana Water Supply Outlook Report**

**Natural Resources Conservation Service**

